INTEGRATED ASSESSMENT (IA) REPORT

for

ASARCO
Columbus, Franklin County, Ohio
U.S. EPA ID: OHD056743933

OHIO ENVIRONMENTAL PROTECTION AGENCY
Division of Emergency & Remedial Response
1800 Watermark Drive
Columbus, Ohio 43215

September, 1995

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TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

1.0 EXECUTIVE SUMMARY

The Ohio Environmental Protection Agency (OEPA) Division of Emergency and Remedial Response (DERR) entered into a cooperative agreement with the United States Environmental protection Agency (U.S. EPA) Region V to conduct an Integrated Assessment (IA) of ASARCO, Franklin County, Columbus, Ohio; U.S. EPA ID# OHD056743933. The purpose of this report is to describe the current environmental threat posed by ASARCO, and to determine if the site has released contaminants into the environment; specifically to soils and the surrounding surface water bodies.

The Workplan for this IA was approved by U.S. EPA on March 9, 1995. The sampling was conducted on April 11, 1995. A total of twenty-eight samples including duplicates and backgrounds were collected both on- and off-site. The samples were analyzed through the U.S EPA Contract Laboratory Program (CLP) for the Target Compound List (TCL) organics, which included volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs); and the Target Analyte List (TAL) metals and cyanide.

Significant findings included elevated levels of various polynuclear aromatic hydrocarbons (PAH) compounds, along with cadmium, zinc, and mercury in the shallow on-site soil samples. On-site sediment and surface water samples also contained very high levels of these compounds and analytes. Sediment and surface water samples collected off-site suggest that contaminants are migrating despite efforts to control the runoff via an on-site water treatment system.

2.0 INTRODUCTION

2.1 Site Description

The American Smelting and Refining Co. (ASARCO) site is located at 1363 Windsor Avenue within the corporation limits of the city of Columbus, Franklin County, Ohio (*Figure 1*). The area surrounding the site is zoned for industrial/residential development. The property is bordered to the north by All City Auto Wrecking Inc. and the W.R.Grace Company; to the south by Joyce Iron and Metal Company; to the east by Joyce Avenue; and to the west by the Conrail Railroad tracks and Hanna Paints. Private residences and a school lie within a quarter mile of the facility (Reference 1).

The site occupies approximately 57 acres; 8.3 acres lie north of Windsor Avenue, while the remaining 39.6 acres lie to the south. ASARCO is located on relatively flat terrain that slopes gently to the southeast towards Alum Creek. The native soil is mostly clay that provides poor infiltration. This results in standing water throughout the site. To help elevate the problem, several feet of fill was deposited over much of the site. The fill on the southern section consisted of clinker, a zinc smelting waste high in heavy metals, and demolition debris. The fill on the northern section contained a mixture of demolition debris, native soils, clinker, and cinders from an on-site coal fired furnace (Reference 1).

Runoff from the site is directed to an on-site wastewater treatment system via open ditches (*Figure 2*). The water treatment plant consists of an upper and lower lagoon ecology plant, and a two large settling tanks. A flocculent, Perclor 710, is added to the water that is funneled into the settling tanks. The south and central drainage ditches are located and originate on the south side of the site, and are directed into the upper lagoon. Some of the water from the south ditch is also funneled through the settling tank system. The northern portion of the site is drained by the American Ditch, which originates just north of ASARCO. This ditch is culverted under Winsor Avenue and into the upper lagoon. The water flows by gravity from the upper to the lower lagoon, where settling and metal uptake occurs (Reference 2).

The treated water is discharged through the Joyce Avenue outfall, and empties back into the American Ditch below the water treatment plant . During times of heavy precipitation, water is discharged into the American Ditch untreated due to the limited capacity of the waste water treatment plant (Reference 1). The American Ditch flows 1.2 miles from the site through an industrial/residential area, and discharges directly into Alum Creek at Maryland Avenue (River Mile 9.1) (Reference 4). Portions of the American Ditch are directed through storm sewers, while the remainder flows above ground. The Ohio EPA's Water Quality Standards designates the American Ditch as a nuisance prevention/ limited resource water, an agricultural and industrial water supply, and a secondary contact recreation water. Alum Creek is designated

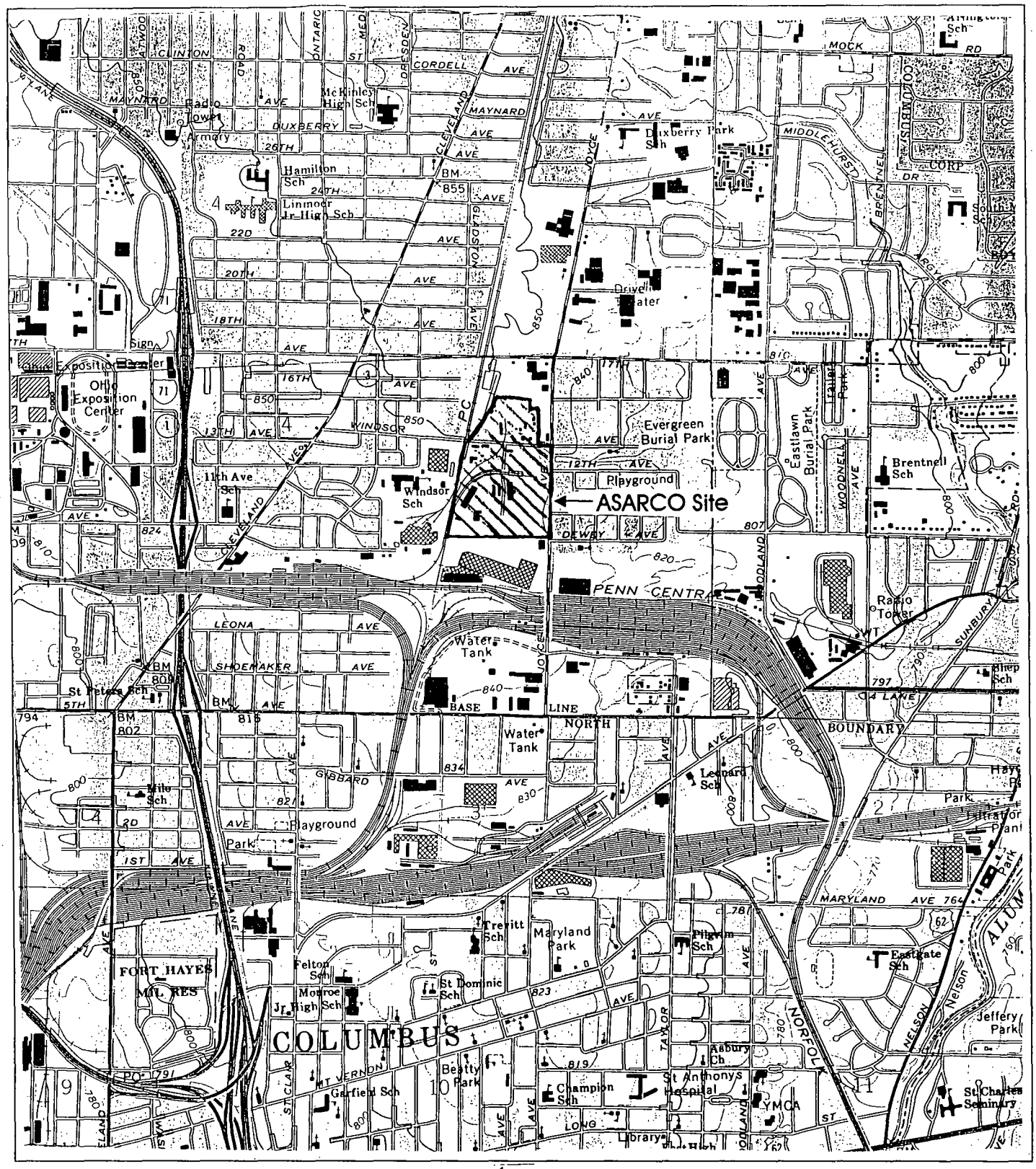

Figure 1:
ASARCO Site Location Map

SOUTHEAST COLUMBUS, OHIO
N3952.5--W8252.5/7.5
1964
Photorevised 1973
AMS 4463 IV NW-Series V852

NORTHEAST COLUMBUS, OHIO
N4000-- W8252.5/7.5
1964
Photorevised 1973
AMS 4464 III SW-Series V852

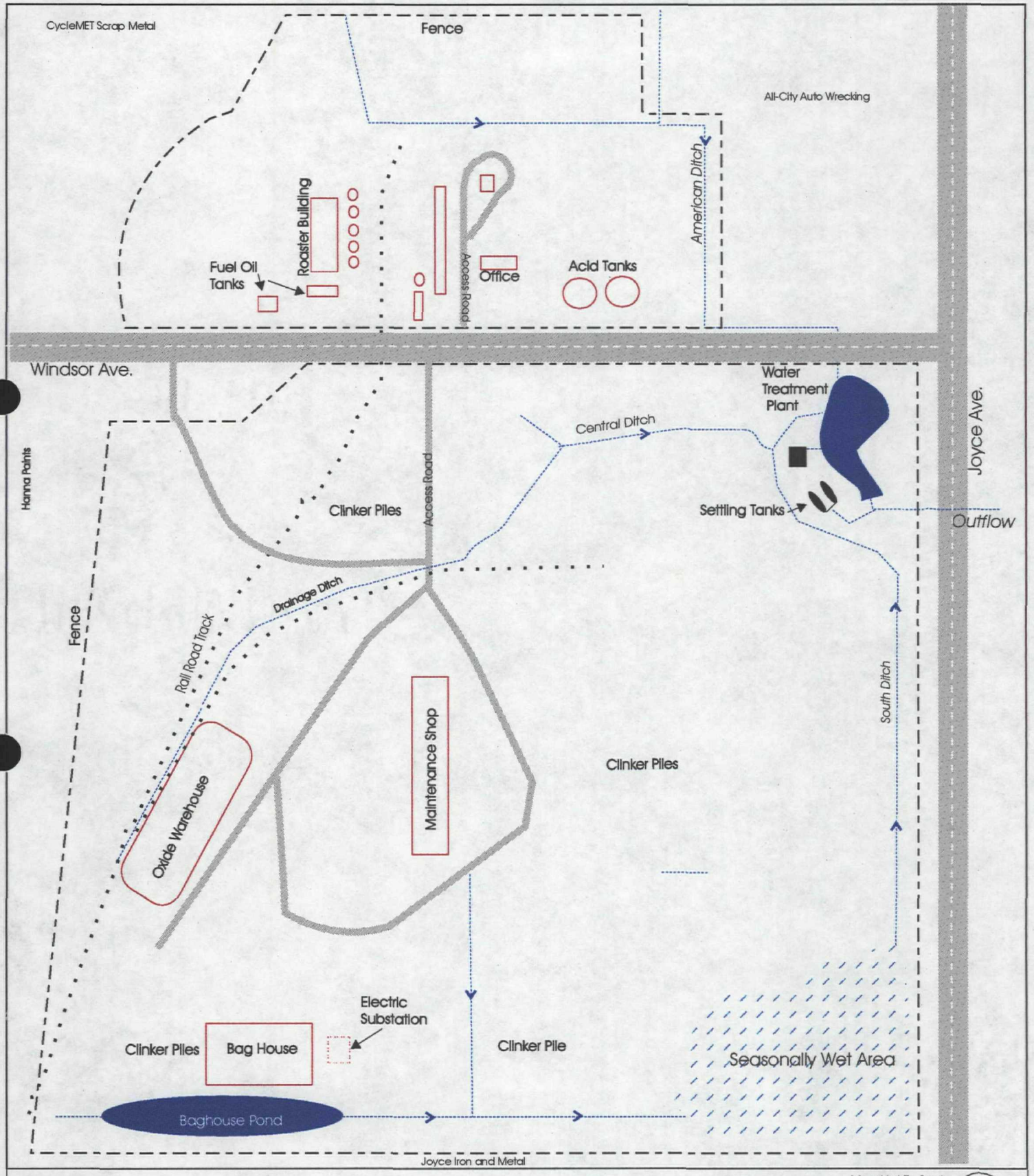

Figure 2:

ASARCO Site Features Map

as a warmwater aquatic life habitat, an agricultural and industrial water supply, and a primary contact recreation water (Reference 3).

The majority of the site is no longer in use and has fallen into disrepair. The northern section of the site consists of abandoned structures and an active sulfuric acid storage and distribution operation for sulfuric acid produced at other ASARCO facilities. The active operation employs the use of a small office building, two 70,000 gallon above ground sulfuric acid tanks and three full time employees. The southern section has a few remaining buildings and railroad spur, along with several clinker piles, and a spring fed pond once used as a source of cooling water. The pond is drained by the south ditch, as well as a seasonally flooded area in the south east corner of the site (Reference 1).

2.2 Site History

The current ASARCO site has been the location for zinc smelting operations since April 1920. The American Zinc Oxide Company originally owned and operated the area south of Windsor Avenue. The northern portion was owned by the Farmers Fertilizer Company, who sold two of three land parcels to American Zinc Oxide on September 2, 1922; and the third parcel was sold on December 24, 1968. ASARCO purchased the property in November of 1971, and operated as a primary zinc oxide smelter until May 1986. During plant operation, about 60 to 65 tons per day of zinc oxide was produced to be used in paint and automobile tires. Sulfuric acid was also produced at about 115 tons per day. Today, a sulfuric acid storage/distribution terminal for product produced at other ASARCO facilities is the only operation at the site (Reference 1).

ASARCO extracted zinc oxide from the zinc sulfide ore called sphalerite, by oxidation, reduction, and back oxidation. The ore was first roasted to free the zinc from the sulfur. This process produced sulfur dioxide, which was turned into sulfuric acid using a vanadium pentoxide catalyst. This operation took place on the north side of the site. The roasted ore was then sent to the southern section of the site where it was mixed with anthracite coal and burned. The mixture was commonly referred to as furnace fines. This resulted in the production of zinc oxide and a zinc smelting waste known as clinker (Reference 1).

By-products and intermediate products were also produced during the process. Major intermediate and by-products included calcines, cadmium/zinc bag house dust from the rotary kiln (CZ dust), de-cadmiumized zinc oxide from roasted calcines (DeCd dust), clinker, waste water treatment sludge and spent vanadium catalyst (Reference 1).

Clinker consists of approximately 12% zinc and 0.1% cadmium. Between 30,000 and 38,000

tons of clinker was used as fill and/or stored at the ASARCO site during the years of operation. It has been documented that water flowing through the clinker has resulted in the leaching of contaminants into surface water via surface run-off. Prior to June of 1989, the run-off from the facility was discharged through the Joyce Avenue outfall to the American Ditch, which entered combined sewers of the City of Columbus. As part of the Interstate 670 project, the ditch was re-routed to discharge directly into Alum Creek (Reference 1).

During the years when the run-off was entering the combined sewer system, the city of Columbus determined that its waste water treatment facility was receiving excessive zinc and cadmium loadings in water originating from the ASARCO site. Water samples taken by the city of Columbus showed the discharge consistently exceeded the city's 3.0 mg/l limit for zinc and the 0.5 mg/l limit for cadmium. From 1971 through 1981 the average dissolved cadmium concentration was 640 ppb, while the dissolved zinc averaged 43,000 ppb. During this time, the Merullo Landscape Company located at 1780 Winsor Avenue filed suite in federal court against ASARCO for polluting the air and water, which killed stock and rendered the nursery unproductive. The dispute was settled out of court, but the contaminated American Ditch continued to be a community issue (Reference 1).

Ohio EPA Division of Surface Water (DSW) tried to issue a National Pollution Discharge Elimination System (NPDES) permit for the contaminated runoff from ASARCO in 1974. However, because the American Ditch entered a city of Columbus combined sewer downstream from the facility, the permit was adjudicated and later withdrawn. Ohio EPA concluded that ASARCO was an indirect discharger, and as such was the responsibility of the city of Columbus. ASARCO was subsequently cited by the city for violations of discharge limits for cadmium and zinc into the sewer system (Reference 1).

In 1982, ASARCO began diverting and capturing the facility's run-off into a series of waterways in an effort to treat the discharge. Sampling data from the slag area run-off for April 27, 1984, May 1, 1984, and April 24, 1986 revealed that the discharge to the American Ditch regularly exceeded city limits for zinc and cadmium concentrations. At that time, ASARCO agreed to begin removing 50 acres of clinker from the facility. Prior to the completion of the clinker removal project, a PCB oil spill originating at the neighboring Joyce Iron and Metal facility contaminated ASARCO property and inhibited a complete clinker stockpile removal (Reference 1).

In November 1987, ASARCO notified the city of its removal of 35,000 tons of zinc slag, which was sold to Horsehead Resources for zinc recovery. However, approximately 2000 tons of PCB contaminated clinker remained on site. In August 1987, the Ohio EPA determined there was still a problem with contaminated run-off. Sample data documented continuing problems with high concentrations of zinc and cadmium. During 1987, ASARCO installed

the ecology water treatment plant that consisted of an upper and a lower lagoon. The purpose of the lagoon was to settle out metals from the runoff waters. The settling tanks were not added to the water treatment system until 1993 (Reference 1).

Post removal samples have shown that the release of contaminants into surface waters has continued despite the voluntary removal. A 1988 Ohio EPA Water Quality Based Effluent Limit (WQBEL) report stated that "overall analysis of cadmium and zinc concentrations from the Joyce Avenue outfall suggests acutely toxic conditions exist on a frequent basis." This report recommended a maximum limit for zinc at 1,298 ppb and cadmium at 188 ppb in the discharge water to protect aquatic life from acute lethal conditions (Reference 5).

When the American Ditch was separated from the city of Columbus sanitary sewer system and redirected to Alum Creek in June of 1989, the Ohio EPA was able to require ASARCO to obtain a NPDES permit. On November 17, 1989, ASARCO filed the NPDES permit application with the Ohio EPA. The NPDES permit number 41N00017*AD for outfall number 41N00017002 was issued on September 21, 1994 and went into effect on November 1, 1994. The final effluent limitations stated in the permit are daily discharge limits of 443 ppb for zinc and 31 ppb for cadmium. The schedule of compliance in the permit was stated for 12 months from the effective date, a complete application for a Permit to Install (PTI) and plans for achieving final compliance must be submitted; full compliance would be obtained within 24 months of the effective date (Reference 6).

In November 1994, a Preliminary Site Investigation was completed at the Columbus ASARCO site by Hydrometrics, Inc, a contractor for ASARCO. In this study, samples were collected and analyzed for eight metals: arsenic, iron, zinc, cadmium, lead, copper, manganese and vanadium. Surface soil samples detected levels of zinc as high as 230,600 ppm, and cadmium as high as 1,553 ppm. Contour maps detailing locations and results can be seen in Appendix C . Sediment and surface water samples were also collected on-site. A ditch surface water sample had levels of zinc at 40,000 ppb and cadmium at 2,000 ppb. Sediment samples contained concentrations ranging from 329 ppm for cadmium and 40,760 ppm for zinc (Reference 7).

2.3 Site Geology & Hydrology

ASARCO is located in the glaciated section of the Central Lowlands Region of Ohio. The soils that cover the surface of the glacial deposits are the (BfA) Bennington-Urban land complex of the Bennington-Pewamo Association. These deep, poorly drained soils (permeability between 0.06 and 2.0 in/hr) are formed in limy, medium and moderately textured upland glacial tills. The surface layer is about 7 inches thick and is a dark greyish

brown, friable silt loam. The 25 inch thick subsoil is a yellowish brown mottled, firm silty clay loam. The substratum reaches a depth of about 70 inches and is a mottled brown, firm clay loam glacial till (Reference 1).

The local bedrock (Ohio and Olentangy Shale) is a carbonaceous shale that grades to a soft clayey shale. It is not a dependable source of water and generally yields less than 2 gallons per minute. The average depth to bedrock on the site is more than 100 feet (Reference 1).

Bedrock is overlain by Wisconsin age ground moraine, which varies in thickness from 100 to 450 feet. The ground moraine is considered a meager source of water, however, small water supplies (between 2 and 100 gpm) are sometimes developed in the thin lenses of sand and gravel that are interbedded in the basal till (Reference 1).

Ohio Department of Natural Resources (ODNR) well logs indicate that two wells have been drilled on the zinc smelting facility property. The first well was located on the southern section in 1935 and the second on the northern section in 1944. The well logs indicate glacial deposits are present to approximately 100 feet where a sand and gravel aquifer is present. The southern well yields 100 gallons per minute; well yeilds were not available for the northern well. According to ASARCO personnel, the southern well has been abandoned, and the northern well is in poor condition and is no longer in production. The status of these wells is unknown at this time. Additional wells are located within one mile of the site. Area wells appear to have been established in the same sand and gravel aquifer. The average depth to the water table is 100 feet, but depth fluctuates with climatic changes. Deep groundwater flow in the area is generally to the east/southeast. The baghouse pond located on the southwest corner of the ASARCO property is spring fed and actively receives recharge from the local groundwater (Reference 1).

3.0 SAMPLING LOCATIONS & RESULTS

A total of twenty-seven samples, including backgrounds and duplicates, were collected both on- and off-site during the April 11, 1995 investigation *(see Figures 3 & 4)*. Standard Quality Assurance and Quality Control (QA/QC) procedures for Site Inspection field activities were followed during the investigation. These procedures, including sample collection, packaging and shipping, and equipment decontamination, are documented in the Quality Assurance Project Plan (QAPP) for Region 5 Superfund Site Inspection activities for Ohio EPA and Ohio EPA Field Standard Operating Procedures (Reference 8, 9).

The samples were analyzed by U.S. EPA Contract Laboratory Program (CLP) laboratories. Analysis included the following parameters: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals and cyanide. Complete analytical results of this investigation are contained in Appendix A. Significant findings based on these data are summarized in Tables 1 through 3. The data were reviewed by U.S.EPA Region 5 personnel for compliance with the Contract Laboratory Program, and validated by Region 5 Central Regional Laboratory staff.

The U.S. EPA sample number prefix assigned to this site was EZN for the organic fraction, and MEWE for the inorganic fraction. For simplicity, the prefix in this report has been changed to SO for soil, SE for sediment, and SW for surface water. The number sequence, which ranged from 57 through 86 has been kept. The data tables in Appendix A and summary Tables 1 through 3 have both the original and revised sample numbers.

The case number for this site was 23452. All the samples were split with Hydrometrics Inc., the contractor hired by ASARCO. Global Positioning System (GPS) and Estimated Position Error (EPE) readings were collected at most sample locations. A listing of these can be found in Appendix B. A photo log of the sampling locations can be found in Appendix D.

3.1 Soil Samples

A total of ten soil samples were collected during this IA . All but one of the soil samples were collected on the portion of the site south of Winsor Avenue. Most of the soil sample locations were selected based on the results of the 1994 Hyrometrics investigation *(Appendix C)* (Reference 7) . Three identified "hot spots" were sampled at a shallow depth (less than two feet) and a deeper depth (greater than two feet). These sample locations were: the west side of the site between the oxide warehouse and railroad spur (SO-61 & SO-62); south of the railroad trestle towards the middle of the site (SO-63 & SO-64); and west of a mound just

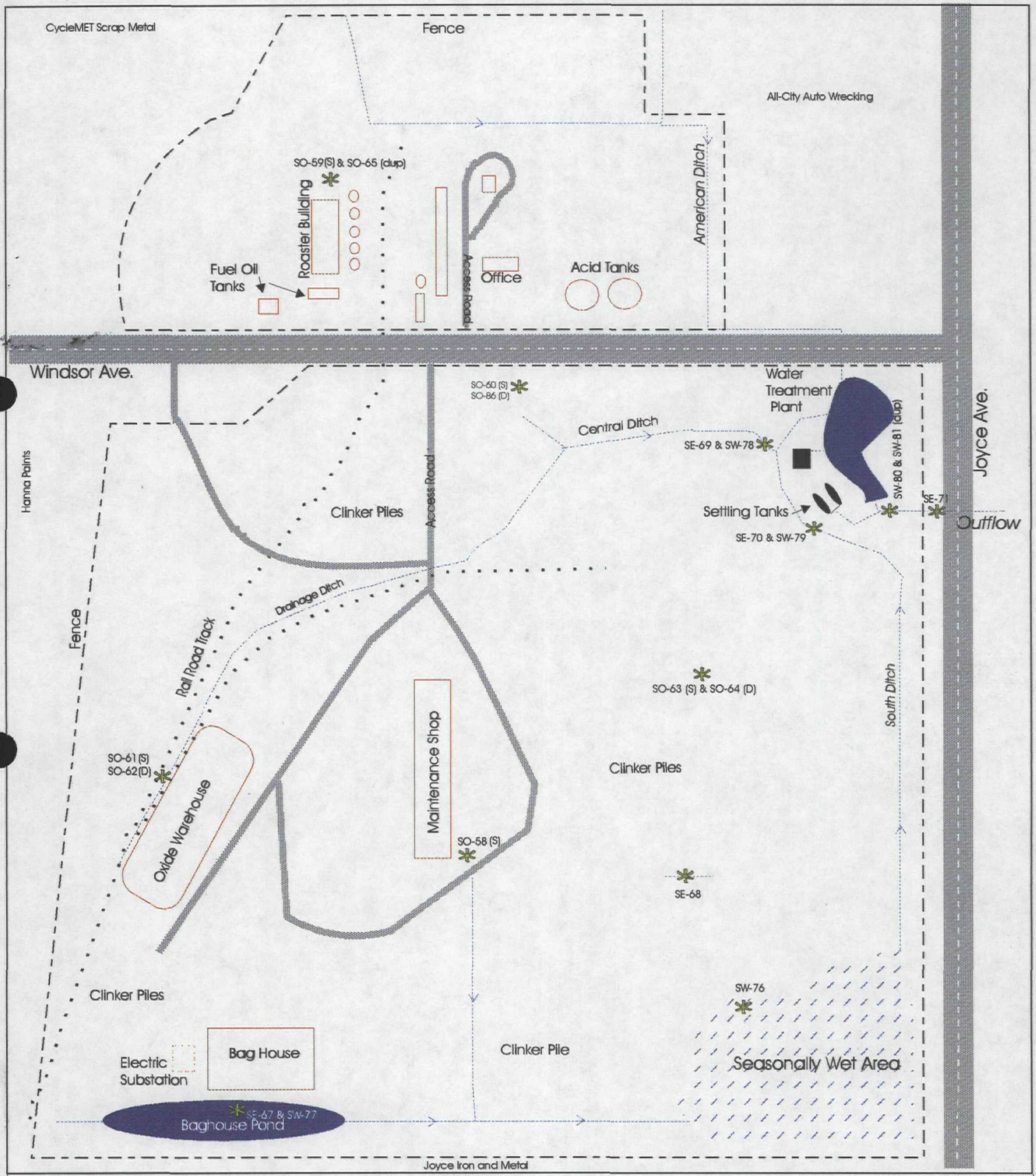

Figure 3:

ASARCO On-Site Sample Location Map

Map Not To Scale

Key

= Sample Location
(S) = Shallow Sample
(D) = Deep sample

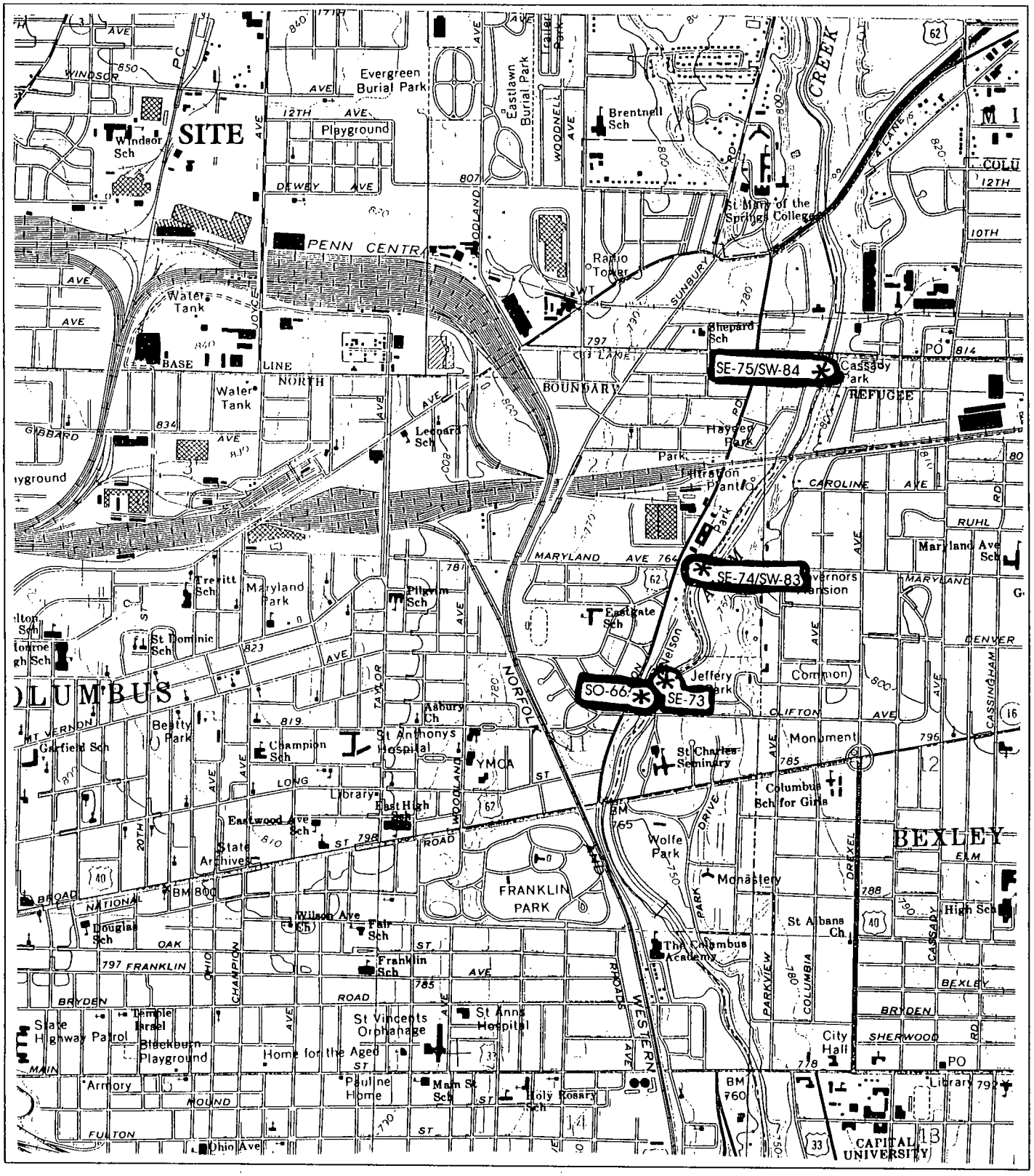

Figure 4:

ASARCO Off-Site Sample Location Map

south of Winsor Avenue (SO-60 & SO-86). A back hoe was employed to reach the deeper sampling locations since most of the soil on the site is intermixed with clinker, making it very difficult to dig by hand. Additionally, a surface soil sample was collected by the maintenance building (SO-58) and behind the roaster building (SO-59 & SO-65 duplicate), the only soil sample collected on the north side of the site. The background sample (SO-66) was collected at Nelson Park, approximately two miles away. Its location can be found on Figure 4.

Overall, the soil samples showed elevated levels of polynuclear aromatic hydrocarbons (PAHs); semi-volatile chlorinated hydrocarbons and other SVOCs; heavy metals; a few pesticides, and to a small extent, PCBs (*Table 1*). The shallow samples exhibited a larger number contaminants at greater concentrations than did the deeper samples.

Zinc and cadmium were detected at concentrations greater than three times the background levels in all the soil samples. Zinc ranged from 2,060 parts per million (ppm) at SO-64 to 250,000 ppm at SO-65 (roaster building). Cadmium ranged from 84.8 ppm to 1,030 ppm, well above the background concentration of 1.4 ppm. Significant levels of mercury, lead, copper, arsenic and antimony also were detected in some on site soil samples. Mercury was detected as high as 0.75 ppm in SO-62, and elevated levels were detected in samples SO-58, SO-59, SO-60 & SO-65. The highest lead level detected was 695 ppm at roaster building, copper at 393 ppm at the maintenance building, and arsenic at 150 ppm at the oxide warehouse.

No significant levels of VOCs were detected in any soil samples. However, a wide variety of low level SVOCs including PAHs, semi-volatile chlorinated hydrocarbons, and phthalates were detected at concentrations greater than three times the background. Some of these compounds include benzo(a)pyrene at 840 parts per billion (ppb), benzo(b)fluoranthene at 810 ppb, fluoranthene at 2200 ppb, and phenanthrene at 220 ppb.

Several pesticides were detected on site. Low levels of DDD, DDE, alpha and gamma chlordane, aldrin, and heptachlor epoxide were detected in several soil samples. The highest concentrations were detected at SO-63, where DDT was reported at 190 ppb, DDD at 10 ppb, and DDE at 100 ppb.

Aroclor-1260 was detected at low levels only on the north side of the site. No PCBs were detected to the south, where a PCB oil spill originating at the Joyce Iron and Metal facility has been documented.

Table 1
Significant Soil Sample Results

SAMPLE NUMBERS	SO-58	SO-59	SO-60	SO-61	SO-62	SO-63	SO-64	SO-65	SO-66	SO-86
DATE SAMPLE COLLECTED	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95
TIME SAMPLE COLLECTED	9:40	8:40	11:00	8:35	9:15	10:30	11:00	9:00	9:10	11:40
SAMPLE DEPTH	2-4"	2-4"	2-4"	0-6"	1-2'	1-3"	2.75'	2-4"	8-12"	2-5'
DESCRIPTION	Maintenance Building	Roaster Building	West of N. Mound	Oxide Warehouse	Oxide Warehouse	S. of Rail Trestle	S. of Rail Trestle	Dup of SO-59	Background	West of N. Mound
ORGANIC TRAFFIC NO.	EZN 58	EZN 59	EZN 60	EZN 61	EZN 62	EZN 63	EZN 64	EZN 65	EZN 66	EZN 86
INORGANIC TRAFFIC NO.	MEWE 58	MEWE 599	MEWE 60	MEWE 61	MEWE 62	MEWE 63	MEWE 64	MEWE 65	MEWE 66	MEWE 86

SEMI-VOLATILE ORGANIC COMPOUNDS	*CRQL*									
1,4-dichlorobenzene	330 ug/kg	25J	410U	400U	460U	440U	25J	420U	430U	400U	410U
naphthalene	330 ug/kg	240J	26J	36J	120J	39J	240J	27J	41J	400U	410U
2-methylnaphthalene	330 ug/kg	390J	30J	60J	170J	43J	310J	34J	36J	400U	410U
acenaphthylene	330 ug/kg	34J	27J	27J	460U	440U	37J	420U	48J	400U	410U
acenaphthene	330 ug/kg	160J	120J	37J	120J	440U	33J	420U	110J	400U	410U
dibenzofuran	330 ug/kg	220J	72J	38J	120J	27J	130J	420U	80J	400U	410U
diethylphthalate	330 ug/kg	23J	410U	400U	460U	440U	430U	420U	430U	400U	410U
fluorene	330 ug/kg	200J	140J	48J	140J	50J	91J	420U	130J	400U	410U
n-nitrosodiphenylamine	330 ug/kg	93J	410U	400U	460U	440U	430U	420U	430U	400U	410U
phenanthrene	330 ug/kg	2200J	1300	600	1800	620	900	100J	1200	330J	41J
anthracene	330 ug/kg	450J	320J	110J	330J	110J	110J	420U	300J	67J	410U
carbazole	330 ug/kg	310J	110J	83J	210J	97J	52J	420U	190J	400U	410U
di-n-butylphthalate	330 ug/kg	29J	410U	400U	460U	440U	430U	420U	430U	400U	410U
fluoranthene	330 ug/kg	2200J	1500	950	1900	840	590	66J	1800	430	53J
pyrene	330 ug/kg	2000J	1700	920	1300	580	500	50J	1600	290J	39J
butylbenzylphthalate	330 ug/kg	68J	410U	400U	460U	440U	30J	420U	23J	400U	410U
benzo(a)anthracene	330 ug/kg	740J	920	410	1100	470	300J	420U	830	280J	26J
chrysene	330 ug/kg	870J	1000	490	960	440	570	71J	990	250J	34J
bis(2-ethylhexyl)phthalate	330 ug/kg	460JBUR	600B	400UJB	460JBU	440U	430UJB	420UJB	1100B	400UBJ	410UJB
benzo(b)fluoranthene	330 ug/kg	540J	730	420	810	340J	420J	41J	760	200J	36J
benzo(k)fluoranthene	330 ug/kg	460J	590	320J	690	200J	240J	420U	750	140J	29J
benzo(a)pyrene	330 ug/kg	490J	740	360J	840	280J	240J	420U	700	180J	27J
indeno(1,2,3-cd)pyrene	330 ug/kg	350J	560	230J	320J	190J	180J	420U	510	94J	28J
dibenzo(a,h)anthracene	330 ug/kg	100J	220J	86J	110J	440U	81J	420U	180J	400U	410U
benzo(g,h,i)perylene	330 ug/kg	330J	490	200J	280J	190J	180J	420U	460	92J	29J

Note: Definitions of data qualifiers can be found in Appendix A.

Table 1
Significant Soil Sample Results

SAMPLE NUMBERS	SO-58	SO-59	SO-60	SO-61	SO-62	SO-63	SO-64	SO-65	SO-66	SO-86
DATE SAMPLE COLLECTED	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95
TIME SAMPLE COLLECTED	9:40	8:40	11:00	8:35	9:15	10:30	11:00	9:00	9:10	11:40
SAMPLE DEPTH	2-4"	2-4"	2-4"	0-6"	1-2'	1-3"	2.75'	2-4"	8-12"	2-5'
DESCRIPTION	Maintenance Building	Roaster Building	West of N. Mound	Oxide Warehouse	Oxide Warehouse	S. of Rail Trestle	S. of Rail Trestle	Dup of SO-59	Background	West of N. Mound
ORGANIC TRAFFIC NO.	EZN 58	EZN 59	EZN 60	EZN 61	EZN 62	EZN 63	EZN 64	EZN 65	EZN 66	EZN 86
INORGANIC TRAFFIC NO.	MEWE 58	MEWE 599	MEWE 60	MEWE 61	MEWE 62	MEWE 63	MEWE 64	MEWE 65	MEWE 66	MEWE 86
PESTICIDES/PCBs	***CRQL***									
aldrin	1.7 ug/kg	**2.1JP**	*2.1U*	*2.1U*	*2.4U*	*2.3U*	*2.2U*	*2.2U*	*2.2U*	*2.1U*	*2.1U*
heptachlor epoxide	1.7 ug/kg	*2.4U*	*2.1U*	*2.1U*	*2.4U*	*3.4P*	**3.5P**	*2.2U*	*2.2U*	*2.1U*	*2.1U*
4,4-DDE	3.3 ug/kg	**12**	*4.1U*	**8.9**	**15P**	**16**	**100**	*4.2U*	*4.3U*	*4.0U*	*4.1U*
4,4-DDD	3.3 ug/kg	*4.6U*	*4.1U*	**21**	*4.6U*	*4.4U*	**10P**	*4.2U*	*4.3U*	*4.0U*	*4.1U*
4,4-DDT	3.3 ug/kg	*4.6U*	*4.1U*	*4.0U*	*5.7P*	*4.4U*	**190DP**	*4.2U*	*4.3U*	*24*	*4.1U*
alpha-chlordane	1.7 ug/kg	**5.9P**	*2.1U*	*2.1U*	**2.5P**	*2.3U*	**3.2P**	*2.2U*	*2.2U*	*2.1U*	*2.1U*
gamma-chlordane	1.7 ug/kg	**6.0P**	*2.1U*	*2.1U*	*2.4U*	*2.3U*	**4.1P**	*2.2U*	*2.2U*	*2.1U*	*2.1U*
aroclor-1260	33 ug/kg	*46U*	**280**	*40U*	*46U*	*44U*	*43U*	*42U*	**360**	*40U*	*41U*
TAL METALS/CYANIDE	***CRDL***									
antimony	12 mg/kg	*15.0U*	*14.3U*	*13.4U*	**20.8**	*14.9U*	*16.5U*	*14.2U*	**23.5**	*13.3U*	*13.2U*
arsenic	2 mg/kg	*10.8*	*13.2*	*6.6*	**150**	*13.4*	*8.2*	*14.7*	*10.2*	*10.3*	*16.6*
cadmium	1 mg/kg	**1010**	**1270**	**547**	**127**	**84.8**	**174**	**52.6**	**1030**	*1.4*	**53.9**
calcium	1000 mg/kg	**17200**	**30900**	**20800**	**13000**	**71700**	*4700*	*6010*	**26800**	*4200*	**26300**
copper	5 mg/kg	**393**	**205**	**357**	*49.9*	**128**	**283**	*29.3*	**211**	*27.3*	*24*
lead	0.6 mg/kg	**192**	**695**	**158**	**318**	**679**	**263**	*34.4*	**517**	*24.3*	*19*
magnesium	1000 mg/kg	*7050*	**12300**	*9670*	**24500**	*7850*	*2120*	*4870*	*8140*	*3550*	*10100*
mercury	0.1 mg/kg	**0.61**	**0.39**	**0.43**	*0.27*	**0.75**	*0.31*	*0.13*	**0.44**	*0.12*	*0.12*
selenium	1 mg/kg	**2.1**	*0.99U*	**1.1B**	**1.0B**	**1.3B**	*1.2U*	*0.98U*	*0.95U*	*0.92U*	*0.91U*
zinc	4 mg/kg	**238000**	**214000**	**125000**	**23100**	**22700**	**88700**	**2060**	**250000**	*142*	**3470**

Note: Definitions of data qualifiers can be found in Appendix A.

3.2 Surface Water Samples

A total of eight surface water samples were collected during this investigation. Two of these samples were collected in Alum Creek, one at the American Ditch outfall (SW-83) and one upstream at Cassady Park just below 5th Avenue (SW-84). The remaining samples were collected on site at the seasonal wet area (SW-76); the baghouse pond (SW-77); the central ditch (SW-78); the south ditch (SW-79); and the treatment plant outfall (SW-80 & SW-81 duplicate). The trip blank was SW-57 in which no VOCs were detected.

Very low levels of the BETX compounds (benzene, ethyl benzene, toluene, and xylenes) were detected in the VOC fraction of SW-80 and SW-81 from the treatment plant outfall (*Table 2*). Very low levels of 2-butanone and chloroform, common lab contaminants, were also detected. The PAH naphthalene, was detected at 2 ppb in SW-80 and SW-81, and butylbenzylphthalate was detected at 1 ppb or less in SW-78, SW-79, and SW-81.

Significantly elevated levels of cadmium and zinc were detected in all the surface water samples. The highest concentration was in the central ditch where zinc was detected at 33,300 ppb and cadmium at 544 ppb. The water treatment plant effluent samples SW-80 and SW-81 contained zinc at 649 ppb & 657 ppb respectively, which is above the NPDES permit limit of 443 ppb. Cadmium was detected in these samples at 20 ppb, below the NPDES limit of 31 ppb (Reference 6).

3.3 Sediment Samples

A total of nine sediment samples were collected to correlate with the surface water samples. Three sediment samples were collected from Alum Creek. An upstream sample (SE-75) and an American Ditch outfall sample (SE-74) were in the same approximate locations as the surface water samples. A sediment sample was also collected downstream in Alum Creek at Nelson Park (SE-73). On-site sediment sample locations included the baghouse pond (SE-67), central and south ditches (SE-69 and SE-70), and at the drain tile (SE-68) near the seasonal wet area. A sample was collected at the Joyce Avenue outfall (SE-71), which consisted of a layer of light brown, fluffy, settled flocculent.

Because of the lack of an adequate background sample for the on-site sediment, all the detects in the organic fraction have been bolded in Table 3. The upstream Alum Creek sample was used as the background for the inorganic fraction.

Very high levels of PAH's were detected in most of the sediment samples (*Table 3)*, with the central ditch being the most heavily contaminated of the on-site samples. The central ditch

Table 2
Significant Surface Water Sample Results

SAMPLE NUMBERS	SW-76	SW-77	SW-78	SW-79	SW-80	SW-81	SW-83	SW-84	SW-57
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/10/95
TIME SAMPLE COLLECTED	14:25	15:30	14:15	15:40	16:00	16:00	10:00	14:10	11:00
DESCRIPTION	Seasonally Wet Area	Baghouse Pond	Central Ditch	South Ditch	Treatment Plant Outfall	Duplicate of SW-80	American Ditch Outfall	Upstream	Trip Blank
ORGANIC TRAFFIC NO.	EZN 76	EZN 77	EZN 78	EZN 79	EZN 80	EZN 81	EZN 83	EZN 84	EZN 57
INORGANIC TRAFFIC NO.	MEWE 76	MEWE 77	MEWE 78	MEWE 79	MEWE 80	MEWE 81	MEWE 83	MEWE 84	MEWE 57
VOLATILE ORGANIC COMPOUNDS	***CRQL***								
chloroform	10 ug/l	*10U*	*10U*	*10U*	*10U*	**1J**	*10U*	**1J**	*10U*	*10U*
2-butanone	10 ug/l	*10U*	*10U*	*10U*	*10U*	**8J**	*10U*	*10U*	*10U*	*10U*
benzene	10 ug/l	*10U*	*10U*	*10U*	*10U*	**2J**	**1J**	*10U*	*10U*	*10U*
toluene	10 ug/l	*10U*	*10U*	*10U*	*10U*	**8J**	**8J**	*10U*	*10U*	*10U*
ethyl benzene	10 ug/l	*10U*	*10U*	*10U*	*10U*	**2J**	**2J**	*10U*	*10U*	*10U*
xylenes (total)	10 ug/l	*10U*	*10U*	*10U*	*10U*	**14**	**13**	**1J**	*10U*	*10U*
SEMI-VOLATILE ORGANIC COMPOUNDS	***CRQL***								
naphthalene	10 ug/l	*10U*	*10U*	*10U*	*10U*	**2J**	**2J**	*10U*	*10U*	
butylbenzylphthalate	10 ug/l	*10U*	*10U*	**0.8J**	**1J**	*10U*	**1J**	*10U*	*10U*	
TAL METALS/CYANIDE	***CRDL***								
cadmium	5 ug/l	**362**	**12**	**544**	**372**	**20**	**20**	**13**	*2.9U*	
potassium	5000 ug/l	**20100**	*6680*	**10300**	**18800**	**12700**	**12300**	*2780B*	*3330B*	
zinc	20 ug/l	**8420**	**10900**	**33300**	**12700**	**649**	**657**	**906**	*60*	

Note: Definitions of data qualifiers can be found in Appendix A.

Table 3
Significant Sediment Sample Results

SAMPLE NUMBERS	SE-67	SE-68	SE-69	SE-70	SE-71	SE-72	SE-73	SE-74	SE-75
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95
DESCRIPTION	Baghouse Pond	Drain Tile	Central Ditch	South Ditch	Joyce Ave. Outfall	Dup of 71	Downstream Alum Creek	American Ditch Outfall	Upstream Alum Creek
ORGANIC TRAFFIC NO.	EZN 67	EZN 68	EZN 69	EZN 70	EZN 71	EZN 72	EZN 73	EZN 74	EZN 75
INORGANIC TRAFFIC NO.	MEWE 67	MEWE 68	MEWE 69	MEWE 70	MEWE 71	MEWE 72	MEWE 73	MEWE 74	MEWE 75
VOLATILE ORGANIC COMPOUNDS	***CRQL***								
methylene chloride	10 ug/kg	9J	14J	110	13J	42J	42J	4J	100	6J
acetone	10 ug/kg	15U	21U	70	160	180	170	15U	62	53
carbon disulfide	10 ug/kg	15U	21U	32U	14J	62U	56U	15U	18U	16U
2-butanone	10 ug/kg	15U	21U	32U	36	27J	56U	15U	18U	16U
benzene	10 ug/kg	15U	21U	32U	18U	62U	20J	15U	18U	16U
4-methyl-2-pentanone	10 ug/kg	15U	21U	32U	18U	62U	79	15U	18U	16U
toluene	10 ug/kg	15U	21U	32U	18U	62U	99	15U	2000D	89
ethyl benzene	10 ug/kg	15U	21U	32U	18U	62U	25J	15U	18U	16U
xylenes (total)	10 ug/kg	15U	21U	32U	13J	48J	120	15U	13J	6J
SEMI-VOLATILE ORGANIC COMPOUNDS	***CRQL***								
phenol	330 ug/kg	210J	690U	5300U	580U	1200J	640J	5000U	15000U	520U
4-methylphenol	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	4000J	550
1,2,4-trichlorobenzene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	170J
naphthalene	330 ug/kg	490U	690U	5300U	180J	2100U	1800U	5000U	15000U	91J
2-methylnaphthalene	330 ug/kg	490U	690U	5300U	170J	2100U	1800U	5000U	15000U	520U
acenaphthylene	330 ug/kg	490U	690U	5300U	290J	2100U	1800U	5000U	15000U	520U
acenaphthene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	2600J	8700J	83J
dibenzofuran	330 ug/kg	490U	690U	5300U	250J	2100U	1800U	1800J	6500J	76J
fluorene	330 ug/kg	490U	690U	5300U	310J	2100U	1800U	2900J	9500J	130J
pentachlorophenol	800 ug/kg	1200U	1700U	13000U	800J	5200U	4600U	13000U	38000U	1300U
phenanthrene	330 ug/kg	62J	240J	1800J	3000	1500J	1300J	28000	96000	18000
anthracene	330 ug/kg	490U	690U	5300U	360J	350J	1800U	4100J	13000J	280J
carbazole	330 ug/kg	490U	690U	5300U	370J	2100U	1800U	4000J	14000J	270J
di-n-butylphthalate	330 ug/kg	490U	690U	5300U	82J	330J	1800U	5000U	15000U	120J
fluoranthene	330 ug/kg	98J	350J	5400	3400	3100	2500	36000	120000	3400
pyrene	330 ug/kg	94J	330J	10000	3900	2300	2100	28000	82000	2800

Note: Definitions of data qualifiers can be found in Appendix A.

Table 3
Significant Sediment Sample Results

SAMPLE NUMBERS	SE-67	SE-68	SE-69	SE-70	SE-71	SE-72	SE-73	SE-74	SE-75
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95
DESCRIPTION	Baghouse Pond	Drain Tile	Central Ditch	South Ditch	Joyce Ave Outfall	Dup of 71	Downstream Alum Creek	American Ditch Outfall	Upstream Alum Creek
ORGANIC TRAFFIC NO.	EZN 67	EZN 68	EZN 69	EZN 70	EZN 71	EZN 72	EZN 73	EZN 74	EZN 75
INORGANIC TRAFFIC NO.	MEWE 67	MEWE 68	MEWE 69	MEWE 70	MEWE 71	MEWE 72	MEWE 73	MEWE 74	MEWE 75
SEMI-VOLATILE ORGANIC COMPOUNDS	***CRQL***								
butylbenzylphthalate	330 ug/kg	*490U*	*690U*	*5300U*	**170J**	*2100U*	*1800U*	*5000U*	*15000U*	*520U*
benzo(a)anthracene	330 ug/kg	*490U*	**110J**	**10000**	**1600**	**1200J**	**1100J**	**12000**	**37000**	*1200*
chrysene	330 ug/kg	**72J**	**170J**	**13000**	**2100**	**1700J**	**1400J**	**15000**	**49000**	*1900*
bis(2-ethylhexyl)phthalate	330 ug/kg	*490U*	**160J**	*5300U*	**1500**	**4300**	**3500**	*1200J*	*2200J*	*950*
di-n-octylphthalate	330 ug/kg	*490U*	*690U*	*5300U*	**110J**	**440J**	**360J**	*5000U*	*15000U*	*75J*
benzo(b)fluoranthene	330 ug/kg	**73J**	**130J**	**20000**	**1700**	**1100J**	**970J**	**12000**	**34000**	*1400*
benzo(k)fluoranthene	330 ug/kg	**53J**	**100J**	**14000**	**1300**	**1200J**	**950J**	**10000**	**33000**	*1200*
benzo(a)pyrene	330 ug/kg	*490U*	*690U*	**20000**	**1300**	**1000J**	**710J**	**10000**	**33000**	*1400*
indeno(1,2,3-cd)pyrene	330 ug/kg	*490U*	*690U*	**15000**	**970**	**1100J**	**930J**	**6200**	**20000**	*1300*
benzo(g,h,i)perylene	330 ug/kg	*490U*	*690U*	**7300**	**1000**	**380J**	**500J**	*2200J*	**13000J**	*1400*
PESTICIDES/PCBs	***CRQL***								
endosulfan I	1.7 ug/kg	*2.5U*	*3.5U*	**31**	*15U*	*11U*	*47U*	**230DP**	**540DP**	*30P*
endosulfan II	3.3 ug/kg	*4.9U*	*6.9U*	*53U*	*29U*	*21U*	*9.2U*	**42DP**	**72**	*26U*
4,4-DDT	3.3 ug/kg	*4.9U*	*6.9U*	*53U*	*29U*	*21U*	*9.2U*	*25U*	**34P**	*26U*
alpha-chlordane	1.7 ug/kg	*2.5U*	*3.5U*	*27U*	**18**	*11U*	*47U*	*13U*	*15U*	*13U*
gamma-chlordane	1.7 ug/kg	**7.4P**	*3.5U*	*27U*	*15U*	*11U*	*47U*	*13U*	*15U*	*13U*
TAL METALS/CYANIDE	***CRDL***								
antimony	12 mg/kg	*3.3U*	**10.1B**	*5.0U*	*5.0U*	*14.2U*	*13.3U*	*3.6U*	*4.5U*	*3.9U*
cadmium	1 mg/kg	**26.9**	**444**	**236**	**13.8**	**1110**	**936**	**2.4**	**4.1**	*0.72U*
calcium	1000 mg/kg	*35800*	*6270*	*5950*	*14400*	**93000**	**100000**	*31500*	*35800*	*28800*
copper	5 mg/kg	*52.8*	**271**	**98.8**	*30.9*	**115**	**96.7**	*22.8*	*31.2*	*30.5*
lead	0.6 mg/kg	*27.9*	*60.2*	**159**	**116**	**397**	**317**	*33.6*	*48.9*	*38.8*
mercury	0.1 mg/kg	**1.9**	**1.2**	*0.65*	**11**	**3.4**	**1.2**	*0.33*	*0.34*	*0.28*
selenium	1 mg/kg	*0.75U*	**2.7**	*1.1U*	**2.4**	*3.2U*	*3.0U*	*0.82U*	*1.0U*	*0.89U*
sodium	1000 mg/kg	*160B*	*185B*	*141B*	*158B*	**736B**	**673B**	*150B*	*202B*	*189B*
thallium	2 mg/kg	*0.87U*	**1.6B**	*1.3U*	*1.3U*	*3.7U*	*3.5U*	*0.95U*	*1.2U*	*1.0U*
zinc	4 mg/kg	**5160**	**110000**	**20200**	**750**	**52000**	**38500**	*205*	*358*	*160*

Note: Definitions of data qualifiers can be found in Appendix A.

sample SE-69 had levels of benzo(a)pyrene and benzo(b)fluoranthene at 20,000 ppb. Also detected was benzo(a)anthracene at 10,000 ppb, benzo(k)fluoranthene at 14,000 ppb, chrysene at 13,000 ppb, and indeno(1,2,3-cd)pyrene at 15,000 ppb, all these compounds are carcinogenic. The south ditch and the sample collected from the Joyce Avenue outfall had similar contaminants but at almost a magnitude lower than the central ditch sample. The central ditch drains the area along the railroad tracks by the oxide warehouse (*refer to Figure 2*). This area may be the source for the very high PAH levels.

The samples collected in Alum Creek showed elevated levels of PAHs as well. Although many PAH compounds were detected in the upstream sample, levels were greater than three times the upstream samples in the American Ditch outfall and the downstream Alum Creek samples. Sample SE-74 from the American Ditch outfall had PAH levels ranging from 13,000 ppb for benzo(g,h,i)perylene to 33,000 ppb for benzo(a)pyrene and benzo(k)fluoranthene to 120,000 ppb for fluoranthene. PAHs were detected in the downstream sample, SE-73, at about one-third the concentration as the American Ditch outfall.

Because this is a very industrialized and urban area, elevated PAH levels in Alum Creek are to be expected and can not be completely attributed to the site. Additionally, toluene was detected at 2,000 ppb at the American Ditch outfall. Yankin Majestic Paints has been identified as a discharger to the American Ditch. This, or another unknown discharge may be the source of this contaminant (Reference 4).

Elevated levels of zinc, cadmium, mercury, lead, and copper were detected in most of the on-site sediment samples. The highest levels of zinc were detected in SE-68 by the drain tile at 110,000 ppm and cadmium was detected at 444 ppm. Cadmium levels were highest at the Joyce Avenue outfall where the analyte was detected at 1,110 ppm, mercury was detected at 3.4 ppm, lead was detected at 397 ppm, and zinc was detected at 52,000 ppm. The highest mercury levels were found in the south ditch at 11 ppm. The sediment samples collected in Alum Creek had only a slight elevation in cadmium at 4.1 ppm in SE-74 and 2.4 ppm in SE-73.

4.0 MIGRATION PATHWAYS

4.1 Soil Exposure Pathway

ASARCO is located in an industrial and residential urban area in the middle of the city of Columbus. There are three full time workers on site during the day, and a security guard at night. There are no targets (schools, day care centers, and residences) withing 200 feet of areas of contamination. However, several residences, businesses and the Windsor Elementary school are located within 1000 feet of the site. The total population within 0.25 mile of the site is 73 persons (Reference 1).

Access to the ASARCO site is restricted. A fence surrounds the perimeter of both the north and south sections. There is also a security guard that patrols the facility at night. According to Mr. James Dotson of ASARCO, these security measures do not stop juveniles from trespassing at the site. The sample results indicated that the majority of the contaminents lie with the first few inches. The contaminents include high levels of PAHs and heavy metals (Reference 1).

4.2 Surface Water Pathway

Runoff from the facility is directed to an on-site wastewater treatment system via open ditches. After treatment, the water is discharged through the Joyce Avenue outfall to the American Ditch. During times of heavy runoff, water is discharged into the American Ditch untreated due to the limited treatment capacity at the waste water treatment plant. The American Ditch flows 1.2 miles from the site through an industrial/residential area, and discharges directly into Alum Creek at Maryland Avenue, River Mile 9.1. From this location, Alum Creek flows 8.3 miles to converge with the Big Walnut Creek. The remaining 5.5 miles of the 15 mile target distant limit lies within Big Walnut Creek*(Figure 5)* (Reference 10).

Sediment samples collected from the on-site ditches revealed high levels of heavy metals, including cadmium as high as 444 ppm, zinc as high as 110,000 ppm, and mercury as high as 11 ppm, and very high levels of various PAHs. It appears that contaminants originating on site have leached from the soils into the drainage ditch system where they have been concentrated in the sediments. Sediment samples collected from the effluent of wastewater treatment plant also showed high levels of cadmium, zinc, mercury, and PAHs. The water treatment plant effluent sample detected high levels of zinc. The American Ditch discharge into Alum Creek and the downstream Alum Creek samples had very high levels of PAHs and

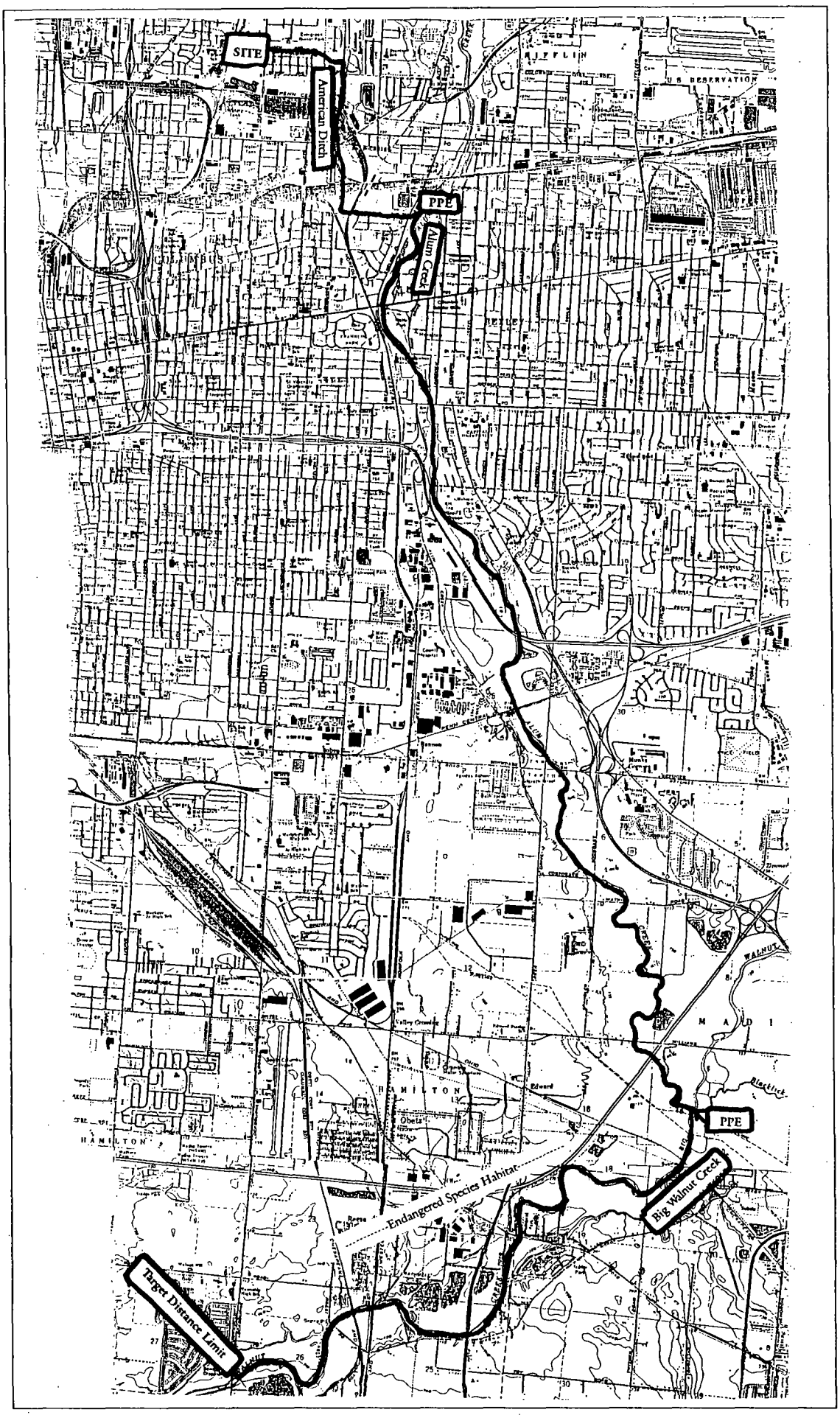

Figure 5: Fifteen Mile Target Distance Limit \ Sensitive Environment Map

toluene. These contaminates cannot be completely attributed to the site, but ASARCO may be a contributor.

The Ohio EPAs Water Quality Standards designates the American Ditch as a nuisance prevention/ limited resource water, an agricultural and industrial water supply, and a secondary contact recreation water. Alum Creek is designated as a warmwater aquatic life habitat, an agricultural and industrial water supply, and a primary contact recreation water. Big Walnut Creek is classified as a state resource exceptional warm water habitat, primary contact, fishery and a public, industrial, and agricultural water supply (Reference 3).

The entire 15 mile target distant limit (TDL) , consisting of Alum Creek and Big Walnut Creek, is used extensively for the recreational fishing of bass, catfish and saugeye. There are no fisheries or recreational areas that have been closed along Alum Creek or the Big Walnut Creek 15 miles down stream from ASARCO. Wetlands may be found along this extent of river, however, no wetland maps have been published for Franklin County at the time of this Integrated Assessment. Therefore, no wetland areas have been identified along the 15 mile length of Alum Creek or Big Walnut Creek (Reference 1).

There are three identified endangered species located within 15 miles down stream of the site. These are aquatic organisms living along or in the 5.5 miles of Big Walnut Creek within the 15 mile TDL. The species are the federal and state endangered Pleurobema Clava (Clubshell Clam), the state endangered Villosa Fabalis (Rayed Bean Clam), and the state endangered Magnonaias Nervosa (Washboard Clam) (Reference 11).

There are no surface water intakes located within 15 miles downstream of the site. Most residence are served by the City of Columbus municipal water system, which derives its water from intakes outside the area of interest (Reference 1).

4.3 Ground Water Pathway

No groundwater samples were collected during this investigation. The majority of the population within a 4 mile radius of ASARCO relies on water supplied by the city of Columbus. However, one trailer park, three churches, one business, one dance school, and one hospital, have their own drinking water wells within 4 miles. No city well fields are located within a 4 mile radius of the site (Reference 1).

The Mount Herman Baptist Church is located one mile from the site and serves 900 people with groundwater. Within 2 to 3 miles of ASARCO lies the Byway Mobile Home Park serving 180 people, Bridgeview Party House serving 100 people, and Mount Carmel Medical

serving 2000 people. Within 3 to 4 miles of the site lies the Christ Centered Church serving 60 people, the Cooke Road Church of the Nazarine serving 100 people, and the Ohio Center for Dance serving 2000 people. The total number of people served by groundwater wells within a 4 mile radius of ASARCO is 3320 (Reference 1).

The average depth to the water table is 100 feet, but depth fluctuates with climatic changes. Deep groundwater flow in the area is generally to the east/southeast. A spring fed pond, located on the southwest corner of the ASARCO property, is actively receiving recharge from the local groundwater (Reference 1).

4.4 Air Pathway

Although Ohio EPA personnel did not initiate a formal air sampling program at ASARCO, portable air monitoring was conducted. Because most of the site is lacking in vegetation, there is a possibility of contaminants migrating as windblown particulates.

The estimated population according to the 1990 census is as follows (Reference 11):

RADIUS	POPULATION
0-1/4	73
1/4-1/2	2,072
1/2-1	10,860
1-2	54,417
2-3	96,340
3-4	85,463

Sensitive environments within a four mile radius include portions of the Olentangy River and Alum Creek, as well as the habitat of four endangered or threathened species. These species are located within two to four miles of the site, and include Epioblasma Rangiana (Northern Riffleshell), Elliptio Crassidens Crassidens (Elephant Ear), Tyto Alba (Barn Owl), and Uniomerus Tetralamus (Pondhorn) (Reference 11). A four-mile radius map can be found in Appendix C.

5.0 REFERENCES

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2 Ohio Environmental Protection Agency. Site reconnaissance Fall, 1994; Spring, 1995.

3 Ohio Environmental Protection Agency. Ohio Revised Code. Volume One: Regulations. Water Quality Standards 3745-1-09. 1992-1993.

4 Ohio Environmental Protection Agency, Division of Surface Water. Franklin County Sewer Atlas.

5 Ohio Environmental Protection Agency, Division of Surface Water. Water Quality Based Effluent Limit Report. June 20, 1988.

6 Ohio Environmental Protection Agency. Authorization to Discharge Under the National Pollutant Discharge Elimination System. April 7, 1994.

7 Hydrometrics, Inc. Preliminary Site Investigation, ASARCO Incorporated Closed Zinc Oxide Plant, Columbus, Ohio. November, 1994.

8 Ohio Environmental Protection Agency, Division of Emergency and Remedial Response. Quality Assurance Project Plan

9 Ohio Environmental Protection Agency, Division of Emergency and Remedial Response. Field Standard Operating Procedures 1992.

10 United States Geological Survey. Southeastern Columbus, Ohio 7.5' Quadrangle Topographic Map. 1964, Photorevised 1982.

11 Ohio Environmental Protection Agency. Geographic Information System. Tiger Census Data. 1995.

Appendix A

Complete Analytical Results

SAMPLE NUMBERS	SO-58	SO-59	SO-60	SO-61	SO-62	SO-63	SO-64	SO-65	SO-66	SO-86
DATE SAMPLE COLLECTED	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95
TIME SAMPLE COLLECTED	9:40	8:40	11:00	8:35	9:15	10:30	11:00	9:00	9:10	11:40
SAMPLE DEPTH	2-4"	2-4"	2-4"	0-6"	1-2'	1-3"	2.75'	2-4"	8-12"	2-5'
DESCRIPTION	Maintenance Building	Roaster Building	West of N Mound	Oxide Warehouse	Oxide Warehouse	S. of Rail Trestle	S. of Rail Trestle	Dup of SO-59	Background	West of N. Mound
ORGANIC TRAFFIC NO.	EZN 58	EZN 59	EZN 60	EZN 61	EZN 62	EZN 63	EZN 64	EZN 65	EZN 66	EZN 86
INORGANIC TRAFFIC NO.	MEWE 58	MEWE 599	MEWE 60	MEWE 61	MEWE 62	MEWE 63	MEWE 64	MEWE 65	MEWE 66	MEWE 86

VOLATILE ORGANIC COMPOUNDS	*CRQL*									
chloromethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
bromomethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
vinyl chloride	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
chloroethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
methylene chloride	10 ug/kg	33UJB	13UJB	68UB	51UB	13UJB	42UB	30UB	13UJB	12UJB	12UJB
acetone	10 ug/kg	14UJB	13UJB	12UJB	5UJB	13UJB	13UB	13UJB	13UJB	12UJB	12UJB
carbon disulfide	10 ug/kg	14UJB	13UJB	12UJB	2UJB	13U	13U	13UJB	13U	12U	12U
1,1-dichloroethene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
1,1-dichloroethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
1,2-dichloroethene (total)	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
chloroform	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
1,2-dichloroethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
2-butanone	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
1,1,1-trichloroethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
carbon tetrachloride	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
bromodichloromethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
1,2-dichloropropane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
cis-1,3-dichloropropene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
trichloroethene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
dibromochloromethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
1,1,2-trichloroethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
benzene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
trans-1,3-dichloropropene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
bromoform	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
4-methyl-2-pentanone	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
2-hexanone	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
tetrachloroethene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
1,1,2,2-tetrachloroethane	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
toluene	10 ug/kg	14U	13U	2J	14U	13U	13U	1J	13U	2J	2J
chlorobenzene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
ethyl benzene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
styrene	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U
xylenes (total)	10 ug/kg	14U	13U	12U	14U	13U	13U	13U	13U	12U	12U

SAMPLE NUMBERS	SO-58	SO-59	SO-60	SO-61	SO-62	SO-63	SO-64	SO-65	SO-66	SO-86
DATE SAMPLE COLLECTED	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95
TIME SAMPLE COLLECTED	9:40	8:40	11:00	8:35	9:15	10:30	11:00	9:00	9:10	11:40
SAMPLE DEPTH	2-4"	2-4"	2-4"	0-6"	1-2'	1-3"	2.75'	2-4"	8-12"	2-5'
DESCRIPTION	Maintenance Building	Roaster Building	West of N. Mound	Oxide Warehouse	Oxide Warehouse	S. of Rail Trestle	S. of Rail Trestle	Dup of SO-59	Background	West of N. Mound
ORGANIC TRAFFIC NO.	EZN 58	EZN 59	EZN 60	EZN 61	EZN 62	EZN 63	EZN 64	EZN 65	EZN 66	EZN 86
INORGANIC TRAFFIC NO.	MEWE 58	MEWE 599	MEWE 60	MEWE 61	MEWE 62	MEWE 63	MEWE 64	MEWE 65	MEWE 66	MEWE 86

SEMI-VOLATILE ORGANIC COMPOUNDS	*CRQL*									
phenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
bis(2-chloroethyl)ether	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2-chlorophenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
1,3-dichlorobenzene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
1,4-dichlorobenzene	330 ug/kg	25J	410U	400U	460U	440U	25J	420U	430U	400U	410U
1,2-dichlorobenzene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2-methylphenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2,2-oxybis(1-chloropropane)	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
4-methylphenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
n-nitroso-di-n-dipropylamine	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
hexachloroethane	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
nitrobenzene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
isophorone	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2-nitrophenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2,4-dimethylphenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
bis(2-chloroethoxy)methane	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2,4-dichlorophenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
1,2,4-trichlorobenzene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
naphthalene	330 ug/kg	240J	26J	36J	120J	39J	240J	27J	41J	400U	410U
4-chloroaniline	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
hexachlorobutadiene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
4-chloro-3-methylphenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2-methylnaphthalene	330 ug/kg	390J	30J	60J	170J	43J	310J	34J	36J	400U	410U
hexachlorocyclopentadiene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2,4,6-trichlorophenol	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2,4,5-trichlorophenol	800 ug/kg	1200UR	1000U	1000U	1200U	1100U	1100U	1100U	1100U	1000U	1000U
2-chloronaphthalene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
2-nitroaniline	800 ug/kg	1200UR	1000U	1000U	1200U	1100U	1100U	1100U	1100U	1000U	1000U
dimethylphthalate	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
acenaphthylene	330 ug/kg	34J	27J	27J	460U	440U	37J	420U	48J	400U	410U
2,6-dinitrotoluene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
3-nitroaniline	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U

SAMPLE NUMBERS	SO-58	SO-59	SO-60	SO-61	SO-62	SO-63	SO-64	SO-65	SO-66	SO-86
DATE SAMPLE COLLECTED	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95
TIME SAMPLE COLLECTED	9:40	8:40	11:00	8:35	9:15	10:30	11:00	9:00	9:10	11:40
SAMPLE DEPTH	2-4"	2-4"	2-4"	0-6"	1-2'	1-3"	2.75'	2-4"	8-12"	2-5'
DESCRIPTION	Maintenance Building	Roaster Building	West of N. Mound	Oxide Warehouse	Oxide Warehouse	S. of Rail Trestle	S. of Rail Trestle	Dup of SO-59	Background	West of N. Mound
ORGANIC TRAFFIC NO.	EZN 58	EZN 59	EZN 60	EZN 61	EZN 62	EZN 63	EZN 64	EZN 65	EZN 66	EZN 86
INORGANIC TRAFFIC NO.	MEWE 58	MEWE 599	MEWE 60	MEWE 61	MEWE 62	MEWE 63	MEWE 64	MEWE 65	MEWE 66	MEWE 86

SEMI-VOLATILE ORGANIC COMPOUNDS	*CRQL*									
acenaphthene	330 ug/kg	160J	120J	37J	120J	440U	33J	420U	110J	400U	410U
2,4-dinitrophenol	800 ug/kg	1200UR	1000U	1000U	1200U	1100U	1100U	1100U	1100U	1000U	1000U
4-nitrophenol	800 ug/kg	1200UR	1000U	1000U	1200U	1100U	1100U	1100U	1100U	1000U	1000U
dibenzofuran	330 ug/kg	220J	72J	38J	120J	27J	130J	420U	80J	400U	410U
2,4-dinitrotoluene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
diethylphthalate	330 ug/kg	23J	410U	400U	460U	440U	430U	420U	430U	400U	410U
4-chlorophenyl-phenyl ether	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
fluorene	330 ug/kg	200J	140J	48J	140J	50J	91J	420U	130J	400U	410U
4-nitroaniline	800 ug/kg	1200UR	1000U	1000U	1200U	1100U	1100U	1100U	1100U	1000U	1000U
4,6-dinitro-2-methylphenol	800 ug/kg	1200UR	1000U	1000U	1200U	1100U	1100U	1100U	1100U	1000U	1000U
n-nitrosodiphenylamine	330 ug/kg	93J	410U	400U	460U	440U	430U	420U	430U	400U	410U
4-bromophenyl-phenyl ether	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
hexachlorobenzene	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
pentachlorophenol	800 ug/kg	1200UR	1000U	1000U	1200U	1100U	1100U	1100U	1100U	1000U	1000U
phenanthrene	330 ug/kg	2200J	1300	600	1800	620	900	100J	1200	330J	41J
anthracene	330 ug/kg	450J	320J	110J	330J	110J	110J	420U	300J	67J	410U
carbazole	330 ug/kg	310J	110J	83J	210J	97J	52J	420U	190J	400U	410U
di-n-butylphthalate	330 ug/kg	29J	410U	400U	460U	440U	430U	420U	430U	400U	410U
fluoranthene	330 ug/kg	2200J	1500	950	1900	840	590	66J	1800	430	53J
pyrene	330 ug/kg	2000J	1700	920	1300	580	500	50J	1600	290J	39J
butylbenzylphthalate	330 ug/kg	68J	410U	400U	460U	440U	30J	420U	23J	400U	410U
3,3-dichlorobenzidine	330 ug/kg	460UR	410U	400U	460U	440U	430U	420U	430U	400U	410U
benzo(a)anthracene	330 ug/kg	740J	920	410	1100	470	300J	420U	830	280J	26J
chrysene	330 ug/kg	870J	1000	490	960	440	570	71J	990	250J	34J
bis(2-ethylhexyl)phthalate	330 ug/kg	460JBUR	600B	400UJB	460JBU	440U	430UJB	420UJB	1100B	400UBJ	410UJB
di-n-octylphthalate	330 ug/kg	44J	410U	92J	460U	440U	430U	420U	70J	38J	410U
benzo(b)fluoranthene	330 ug/kg	540J	730	420	810	340J	420J	41J	760	200J	36J
benzo(k)fluoranthene	330 ug/kg	460J	590	320J	690	200J	240J	420U	750	140J	29J
benzo(a)pyrene	330 ug/kg	490J	740	360J	840	280J	240J	420U	700	180J	27J
indeno(1,2,3-cd)pyrene	330 ug/kg	350J	560	230J	320J	190J	180J	420U	510	94J	28J
dibenzo(a,h)anthracene	330 ug/kg	100J	220J	86J	110J	440U	81J	420U	180J	400U	410U
benzo(g,h,i)perylene	330 ug/kg	330J	490	200J	280J	190J	180J	420U	460	92J	29J

SAMPLE NUMBERS	SO-58	SO-59	SO-60	SO-61	SO-62	SO-63	SO-64	SO-65	SO-66	SO-86
DATE SAMPLE COLLECTED	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95
TIME SAMPLE COLLECTED	9:40	8:40	11:00	8:35	9:15	10:30	11:00	9:00	9:10	11:40
SAMPLE DEPTH	2-4"	2-4"	2-4"	0-6"	1-2'	1-3"	2.75'	2-4"	8-12"	2-5'
DESCRIPTION	Maintenance Building	Roaster Building	West of N. Mound	Oxide Warehouse	Oxide Warehouse	S. of Rail Trestle	S. of Rail Trestle	Dup of SO-59	Background	West of N. Mound
ORGANIC TRAFFIC NO.	EZN 58	EZN 59	EZN 60	EZN 61	EZN 62	EZN 63	EZN 64	EZN 65	EZN 66	EZN 86
INORGANIC TRAFFIC NO.	MEWE 58	MEWE 599	MEWE 60	MEWE 61	MEWE 62	MEWE 63	MEWE 64	MEWE 65	MEWE 66	MEWE 86

PESTICIDES/PCBs	*CRQL*									
alpha-BHC	1.7 ug/kg	2.4U	2.1U	2.1U	2.4U	2.3U	2.2U	2.2U	2.2U	2.1U	2.1U
beta-BHC	1.7 ug/kg	2.4U	2.1U	2.1U	2.4U	2.3U	2.2U	2.2U	2.2U	2.1U	2.1U
delta-BHC	1.7 ug/kg	2.4U	2.1U	2.1U	2.4U	2.3U	2.2U	2.2U	2.2U	2.1U	2.1U
gamma-BHC (Lindane)	1.7 ug/kg	2.4U	2.1U	2.1U	2.4U	2.3U	2.2U	2.2U	2.2U	2.1U	2.1U
heptachlor	1.7 ug/kg	2.4U	2.1U	2.1U	2.4U	2.3U	2.2U	2.2U	2.2U	2.1U	2.1U
aldrin	1.7 ug/kg	2.1JP	2.1U	2.1U	2.4U	2.3U	2.2U	2.2U	2.2U	2.1U	2.1U
heptachlor epoxide	1.7 ug/kg	2.4U	2.1U	2.1U	2.4U	3.4P	3.5P	2.2U	2.2U	2.1U	2.1U
endosulfan I	1.7 ug/kg	2.4U	2.1U	2.1U	2.4U	2.3U	2.2U	2.2U	2.2U	2.1U	2.1U
dieldrin	3.3 ug/kg	4.6U	4.1U	4.0U	2.4U	4.4U	4.3U	4.2U	4.3U	4.0U	4.1U
4,4-DDE	3.3 ug/kg	12	4.1U	8.9	15P	16	100	4.2U	4.3U	4.0U	4.1U
endrin	3.3 ug/kg	4.6U	4.1U	4.0U	4.6U	4.4U	4.3U	4.2U	4.3U	4.0U	4.1U
endosulfan II	3.3 ug/kg	4.6U	4.1U	4.0U	4.6U	4.4U	4.3U	4.2U	4.3U	4.0U	4.1U
4,4-DDD	3.3 ug/kg	4.6U	4.1U	21	4.6U	4.4U	10P	4.2U	4.3U	4.0U	4.1U
endosulfan sulfate	3.3 ug/kg	4.6U	4.1U	4.0U	4.6U	4.4U	4.3U	4.2U	4.3U	4.0U	4.1U
4,4-DDT	3.3 ug/kg	4.6U	4.1U	4.0U	5.7P	4.4U	190DP	4.2U	4.3U	24	4.1U
methoxychlor	17.0 ug/kg	24U	21U	21U	24U	23U	22U	22U	22U	21U	21U
endrin ketone	3.3 ug/kg	4.6U	4.1U	4.0U	4.6U	4.4U	4.3U	4.2U	4.3U	4.0U	4.1U
endrin aldehyde	3.3 ug/kg	4.6U	4.1U	4.0U	4.6U	4.4U	4.3U	4.2U	4.3U	4.0U	4.1U
alpha-chlordane	1.7 ug/kg	5.9P	2.1U	2.1U	2.5P	2.3U	3.2P	2.2U	2.2U	2.1U	2.1U
gamma-chlordane	1.7 ug/kg	6.0P	2.1U	2.1U	2.4U	2.3U	4.1P	2.2U	2.2U	2.1U	2.1U
toxaphene	170 ug/kg	240U	210U	210U	240U	230U	220U	220U	220U	210U	210U
aroclor-1016	33 ug/kg	46U	41U	40U	46U	44U	43U	42U	43U	40U	41U
aroclor-1221	67 ug/kg	94U	83U	82U	94U	90U	88U	86U	87U	82U	83U
aroclor-1232	33 ug/kg	46U	41U	40U	46U	44U	43U	42U	43U	40U	41U
aroclor-1242	33 ug/kg	46U	41U	40U	46U	44U	43U	42U	43U	40U	41U
aroclor-1248	33 ug/kg	46U	41U	40U	46U	44U	43U	42U	43U	40U	41U
aroclor-1254	33 ug/kg	46U	41U	40U	46U	44U	43U	42U	43U	40U	41U
aroclor-1260	33 ug/kg	46U	280	40U	46U	44U	43U	42U	360	40U	41U

SAMPLE NUMBERS	SO-58	SO-59	SO-60	SO-61	SO-62	SO-63	SO-64	SO-65	SO-66	SO-86
DATE SAMPLE COLLECTED	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95	4\11\95
TIME SAMPLE COLLECTED	9:40	8:40	11:00	8:35	9:15	10:30	11:00	9:00	9:10	11:40
SAMPLE DEPTH	2-4"	2-4"	2-4"	0-6"	1-2'	1-3"	2.75'	2-4"	8-12"	2-5'
DESCRIPTION	Maintenance Building	Roaster Building	West of N. Mound	Oxide Warehouse	Oxide Warehouse	S. of Rail Trestle	S. of Rail Trestle	Dup of SO-59	Background	West of N. Mound
ORGANIC TRAFFIC NO.	EZN 58	EZN 59	EZN 60	EZN 61	EZN 62	EZN 63	EZN 64	EZN 65	EZN 66	EZN 86
INORGANIC TRAFFIC NO.	MEWE 58	MEWE 599	MEWE 60	MEWE 61	MEWE 62	MEWE 63	MEWE 64	MEWE 65	MEWE 66	MEWE 86
TAL METALS/CYANIDE	***CRDL***									
aluminum	40 mg/kg	4920	5710	8120	75800	18500	5780	11500	4830	14000	10500
antimony	12 mg/kg	15.0U	14.3U	13.4U	20.8	14.9U	16.5U	14.2U	23.5	13.3U	13.2U
arsenic	2 mg/kg	10.8	13.2	6.6	150	13.4	8.2	14.7	10.2	10.3	16.6
barium	40 mg/kg	117	80	165	83.4	245	152	71.8	56.8	166	80
beryllium	1 mg/kg	0.55B	0.52B	0.97B	0.54B	1.1B	0.90B	0.78B	0.25B	0.97B	0.48B
cadmium	1 mg/kg	1010	1270	547	127	84.8	174	52.6	1030	1.4	53.9
calcium	1000 mg/kg	17200	30900	20800	13000	71700	4700	6010	26800	4200	26300
chromium	2 mg/kg	10.9	10.6	12.4	21.3	27.4	12.9	15.3	9	17.6	12.7
cobalt	10 mg/kg	9.6B	7.3B	15.3	3.5B	6.5B	14.4B	9.1B	6.5B	16.2	11.3B
copper	5 mg/kg	393	205	357	49.9	128	283	29.3	211	27.3	24
iron	20 mg/kg	16500	20000	25000	13500	21800	12300	28000	15800	29700	21800
lead	0.6 mg/kg	192	695	158	318	679	263	34.4	517	24.3	19
magnesium	1000 mg/kg	7050	12300	9670	24500	7850	2120	4870	8140	3550	10100
manganese	3 mg/kg	129	171	323	281	579	202	178	117	902	314
mercury	0.1 mg/kg	0.61	0.39	0.43	0.27	0.75	0.31	0.13	0.44	0.12	0.12
nickel	8 mg/kg	25.1	20.5	31.3	10.3B	18.8	29.1	38.3	17.3	35.7	27.5
potassium	1000 mg/kg	836B	1110B	2050	837B	2930	851B	2430	969B	2610	1510
selenium	1 mg/kg	2.1	0.99U	1.1B	1.0B	1.3B	1.2U	0.98U	0.95U	0.92U	0.91U
silver	2 mg/kg	1.9U	1.8U	1.7U	1.9U	1.9U	2.1U	1.8U	1.7U	1.7U	1.7U
sodium	1000 mg/kg	396B	356B	522B	556B	565B	491B	368B	318B	297B	331B
thallium	2 mg/kg	0.82U	0.78U	0.73U	0.81U	0.82U	0.93U	0.78U	0.75U	0.72U	0.72U
vanadium	10 mg/kg	16.7	16.9	22.1	52.6	38.6	24.3	29.8	13	39.1	27.8
zinc	4 mg/kg	238000	214000	125000	23100	22700	88700	2060	250000	142	3470
cyanide	2 mg/kg	0.75	0.65U	0.61U	0.67U	0.68U	0.77U	0.65U	0.63U	0.60U	0.60U

SAMPLE NUMBERS	SW-76	SW-77	SW-78	SW-79	SW-80	SW-81	SW-83	SW-84	SW-57
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/10/95
TIME SAMPLE COLLECTED	14:25	15:30	14:15	15:40	16:00	16:00	10:00	14:10	11:00
DESCRIPTION	Seasonally Wet Area	Baghouse Pond	Central Ditch	South Ditch	Treatment Plant Outfall	Duplicate of SW-80	American Ditch Outfall	Upstream	Trip Blank
ORGANIC TRAFFIC NO.	EZN 76	EZN 77	EZN 78	EZN 79	EZN 80	EZN 81	EZN 83	EZN 84	EZN 57
INORGANIC TRAFFIC NO.	MEWE 76	MEWE 77	MEWE 78	MEWE 79	MEWE 80	MEWE 81	MEWE 83	MEWE 84	MEWE 57

VOLATILE ORGANIC COMPOUNDS	*CRQL*									
chloromethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
bromomethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
vinyl chloride	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
chloroethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
methylene chloride	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
acetone	10 ug/l	10JBU	10U	10U	10U	21BU	20BU	10U	10U	10U
carbon disulfide	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
1,1-dichloroethene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
1,1-dichloroethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
1,2-dichloroethene (total)	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
chloroform	10 ug/l	10U	10U	10U	10U	1J	10U	1J	10U	10U
1,2-dichloroethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
2-butanone	10 ug/l	10U	10U	10U	10U	8J	10U	10U	10U	10U
1,1,1-trichloroethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
carbon tetrachloride	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
bromodichloromethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
1,2-dichloropropane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
cis-1,3-dichloropropene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
trichloroethene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
dibromochloromethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2-trichloroethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
benzene	10 ug/l	10U	10U	10U	10U	2J	1J	10U	10U	10U
trans-1,3-dichloropropene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
bromoform	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
4-methyl-2-pentanone	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
2-hexanone	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
tetrachloroethene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-tetrachloroethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
toluene	10 ug/l	10U	10U	10U	10U	8J	8J	10U	10U	10U
chlorobenzene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
ethyl benzene	10 ug/l	10U	10U	10U	10U	2J	2J	10U	10U	10U
styrene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U	10U
xylenes (total)	10 ug/l	10U	10U	10U	10U	14	13	1J	10U	10U

SAMPLE NUMBERS	SW-76	SW-77	SW-78	SW-79	SW-80	SW-81	SW-83	SW-84	SW-57
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/10/95
TIME SAMPLE COLLECTED	14:25	15:30	14:15	15:40	16:00	16:00	10:00	14:10	11:00
DESCRIPTION	Seasonally Wet Area	Baghouse Pond	Central Ditch	South Ditch	Treatment Plant Outfall	Duplicate of SW-80	American Ditch Outfall	Upstream	Trip Blank
ORGANIC TRAFFIC NO.	EZN 76	EZN 77	EZN 78	EZN 79	EZN 80	EZN 81	EZN 83	EZN 84	EZN 57
INORGANIC TRAFFIC NO.	MEWE 76	MEWE 77	MEWE 78	MEWE 79	MEWE 80	MEWE 81	MEWE 83	MEWE 84	MEWE 57

SEMI-VOLATILE ORGANIC COMPOUNDS	*CRQL*								
phenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
bis(2-chloroethyl)ether	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2-chlorophenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
1,3-dichlorobenzene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
1,4-dichlorobenzene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
1,2-dichlorobenzene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2-methylphenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2,2-oxybis(1-chloropropane)	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
4-methylphenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
n-nitroso-di-n-dipropylamine	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
hexachloroethane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
nitrobenzene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
isophorone	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2-nitrophenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2,4-dimethylphenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
bis(2-chloroethoxy)methane	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2,4-dichlorophenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
1,2,4-trichlorobenzene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
naphthalene	10 ug/l	10U	10U	10U	10U	2J	2J	10U	10U
4-chloroaniline	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
hexachlorobutadiene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
4-chloro-3-methylphenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2-methylnaphthalene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
hexachlorocyclopentadiene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2,4,6-trichlorophenol	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2,4,5-trichlorophenol	25 ug/l	25U	25U	25U	25U	25U	25U	25U	25U
2-chloronaphthalene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2-nitroaniline	25 ug/l	25U	25U	25U	25U	25U	25U	25U	25U
dimethylphthalate	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
acenaphthylene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2,6-dinitrotoluene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
3-nitroaniline	25 ug/l	25U	25U	25U	25U	25U	25U	25U	25U

SAMPLE NUMBERS	SW-76	SW-77	SW-78	SW-79	SW-80	SW-81	SW-83	SW-84	SW-57
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/10/95
TIME SAMPLE COLLECTED	14:25	15:30	14:15	15:40	16:00	16:00	10:00	14:10	11:00
DESCRIPTION	Seasonally Wet Area	Baghouse Pond	Central Ditch	South Ditch	Treatment Plant Outfall	Duplicate of SW-80	American Ditch Outfall	Upstream	Trip Blank
ORGANIC TRAFFIC NO.	EZN 76	EZN 77	EZN 78	EZN 79	EZN 80	EZN 81	EZN 83	EZN 84	EZN 57
INORGANIC TRAFFIC NO.	MEWE 76	MEWE 77	MEWE 78	MEWE 79	MEWE 80	MEWE 81	MEWE 83	MEWE 84	MEWE 57

SEMI-VOLATILE ORGANIC COMPOUNDS	*CRQL*								
acenaphthene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2,4-dinitrophenol	25 ug/l	25U	25U	25U	25U	25U	25U	25U	25U
4-nitrophenol	25 ug/l	25U	25U	25U	25U	25U	25U	25U	25U
dibenzofuran	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
2,4-dinitrotoluene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
diethylphthalate	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
4-chlorophenyl-phenyl ether	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
fluorene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
4-nitroaniline	25 ug/l	25U	25U	25U	25U	25U	25U	25U	25U
4,6-dinitro-2-methylphenol	25 ug/l	25U	25U	25U	25U	25U	25U	25U	25U
n-nitrosodiphenylamine	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
4-bromophenyl-phenyl ether	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
hexachlorobenzene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
pentachlorophenol	25 ug/l	25U	25U	25U	25U	25U	25U	25U	25U
phenanthrene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
anthracene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
carbazole	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
di-n-butylphthalate	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
fluoranthene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
pyrene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
butylbenzylphthalate	10 ug/l	10U	10U	0.8J	1J	10U	1J	10U	10U
3,3-dichlorobenzidine	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
benzo(a)anthracene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
chrysene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
bis(2-ethylhexyl)phthalate	10 ug/l	10U	10BJU	10U	10U	10U	10U	10U	10JBU
di-n-octylphthalate	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
benzo(b)fluoranthene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
benzo(k)fluoranthene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
benzo(a)pyrene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
indeno(1,2,3-cd)pyrene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
dibenzo(a,h)anthracene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U
benzo(g,h,i)perylene	10 ug/l	10U	10U	10U	10U	10U	10U	10U	10U

SAMPLE NUMBERS	SW-76	SW-77	SW-78	SW-79	SW-80	SW-81	SW-83	SW-84	SW-57
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/10/95
TIME SAMPLE COLLECTED	14:25	15:30	14:15	15:40	16:00	16:00	10:00	14:10	11:00
DESCRIPTION	Seasonally Wet Area	Baghouse Pond	Central Ditch	South Ditch	Treatment Plant Outfall	Duplicate of SW-80	American Ditch Outfall	Upstream	Trip Blank
ORGANIC TRAFFIC NO.	EZN 76	EZN 77	EZN 78	EZN 79	EZN 80	EZN 81	EZN 83	EZN 84	EZN 57
INORGANIC TRAFFIC NO.	MEWE 76	MEWE 77	MEWE 78	MEWE 79	MEWE 80	MEWE 81	MEWE 83	MEWE 84	MEWE 57

PESTICIDES/PCBs	*CRQL*								
alpha-BHC	0.05 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
beta-BHC	0.05 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
delta-BHC	0.05 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
gamma-BHC (Lindane)	0.05 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
heptachlor	0.05 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
aldrin	0.05 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
heptachlor epoxide	0.05 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
endosulfan I	0.05 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
dieldrin	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
4,4-DDE	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
endrin	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
endosulfan II	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
4,4-DDD	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
endosulfan sulfate	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
4,4-DDT	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
methoxychlor	0.50 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
endrin ketone	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
endrin aldehyde	0.10 ug/l	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
alpha-chlordane	0.50 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
gamma-chlordane	0.50 ug/l	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
toxaphene	5.0 ug/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
aroclor-1016	0.10 ug/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
aroclor-1221	2.0 ug/l	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U
aroclor-1232	0.10 ug/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
aroclor-1242	0.10 ug/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
aroclor-1248	0.10 ug/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
aroclor-1254	0.10 ug/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
aroclor-1260	0.10 ug/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U

SAMPLE NUMBERS	SW-76	SW-77	SW-78	SW-79	SW-80	SW-81	SW-83	SW-84	SW-57
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/10/95
TIME SAMPLE COLLECTED	14:25	15:30	14:15	15:40	16:00	16:00	10:00	14:10	11:00
DESCRIPTION	Seasonally Wet Area	Baghouse Pond	Central Ditch	South Ditch	Treatment Plant Outfall	Duplicate of SW-80	American Ditch Outfall	Upstream	Trip Blank
ORGANIC TRAFFIC NO.	EZN 76	EZN 77	EZN 78	EZN 79	EZN 80	EZN 81	EZN 83	EZN 84	EZN 57
INORGANIC TRAFFIC NO.	MEWE 76	MEWE 77	MEWE 78	MEWE 79	MEWE 80	MEWE 81	MEWE 83	MEWE 84	MEWE 57

TAL METALS/CYANIDE	*CRDL*								
aluminum	200 ug/l	877	293	220	466	316	308	614	6590
antimony	60 ug/l	55U	55U	55U	55U	55U	55U	55U	55U
arsenic	10 ug/l	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U
barium	200 ug/l	42B	37B	21B	32B	25B	25B	75B	101B
beryllium	5 ug/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
cadmium	5 ug/l	362	12	544	372	20	20	13	2.9U
calcium	5000 ug/l	125000	141000	156000	136000	112000	112000	108000	57000
chromium	10 ug/l	5.0B	5B	4.0U	4.0U	4.0B	4.0U	4.0U	12
cobalt	50 ug/l	7.9U	7.9U	7.9U	7.9U	7.9U	7.9U	7.9U	7.9U
copper	25 ug/l	27	19B	6.0U	10.0B	6.0U	6.0B	17B	13.0B
iron	100 ug/l	1170	856	29.0U	792	74.0B	73.B	811	7430
lead	3 ug/l	3.5	2.9U	4.9	6.7	2.9U	2.9U	14.3	6.1
magnesium	5000 ug/l	24000	38500	23400	23600	26400	26600	28400	19100
manganese	15 ug/l	230	384	48	166	58	45	202	150
mercury	0.2 ug/l	0.10U	0.10U	0.10B	0.02	0.10U	0.10U	0.10U	1.10U
nickel	40 ug/l	27U	27U	27U	27.0U	27U	27.0U	27.0U	27U
potassium	5000 ug/l	20100	6680	10300	18800	12700	12300	2780B	3330B
selenium	5 ug/l	3.8U	3.8U	3.8U	3.8U	3.8U	3.8U	3.8U	3.8U
silver	10 ug/l	6.9U	6.9U	6.9U	6.9U	6.9U	6.9U	6.9U	6.9U
sodium	5000 ug/l	25500	23200	15400	22500	117000	121000	66800	39900
thallium	10 ug/l	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U
vanadium	50 ug/l	3.6U	3.6U	3.6U	3.6U	3.6U	3.6U	3.6U	17.0B
zinc	20 ug/l	8420	10900	33300	12700	649	657	906	60
cyanide	10 ug/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U

SAMPLE NUMBERS	SE-67	SE-68	SE-69	SE-70	SE-71	SE-72	SE-73	SE-74	SE-75
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95
DESCRIPTION	Baghouse Pond	Drain Tile	Central Ditch	South Ditch	Joyce Ave. Outfall	Dup of 71	Downstream Alum Creek	American Ditch Outfall	Upstream Alum Creek
ORGANIC TRAFFIC NO.	EZN 67	EZN 68	EZN 69	EZN 70	EZN 71	EZN 72	EZN 73	EZN 74	EZN 75
INORGANIC TRAFFIC NO.	MEWE 67	MEWE 68	MEWE 69	MEWE 70	MEWE 71	MEWE 72	MEWE 73	MEWE 74	MEWE 75
VOLATILE ORGANIC COMPOUNDS	***CRQL***								
chloromethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
bromomethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
vinyl chloride	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
chloroethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
methylene chloride	10 ug/kg	9J	14J	110	13J	42J	42J	4J	100	6J
acetone	10 ug/kg	15U	21U	70	160	180	170	15U	62	53
carbon disulfide	10 ug/kg	15U	21U	32U	14J	62U	56U	15U	18U	16U
1,1-dichloroethene	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
1,1-dichloroethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
1,2-dichloroethene (total)	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
chloroform	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
1,2-dichloroethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
2-butanone	10 ug/kg	15U	21U	32U	36	27J	56U	15U	18U	16U
1,1,1-trichloroethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
carbon tetrachloride	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
bromodichloromethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
1,2-dichloropropane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
cis-1,3-dichloropropene	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
trichloroethene	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
dibromochloromethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
1,1,2-trichloroethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
benzene	10 ug/kg	15U	21U	32U	18U	62U	20J	15U	18U	16U
trans-1,3-dichloropropene	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
bromoform	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
4-methyl-2-pentanone	10 ug/kg	15U	21U	32U	18U	62U	79	15U	18U	16U
2-hexanone	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
tetrachloroethene	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
1,1,2,2-tetrachloroethane	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
toluene	10 ug/kg	15U	21U	32U	18U	62U	99	15U	2000D	89
chlorobenzene	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
ethyl benzene	10 ug/kg	15U	21U	32U	18U	62U	25J	15U	18U	16U
styrene	10 ug/kg	15U	21U	32U	18U	62U	56U	15U	18U	16U
xylenes (total)	10 ug/kg	15U	21U	32U	13J	48J	120	15U	13J	6J

SAMPLE NUMBERS	SE-67	SE-68	SE-69	SE-70	SE-71	SE-72	SE-73	SE-74	SE-75
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95
DESCRIPTION	Baghouse Pond	Drain Tile	Central Ditch	South Ditch	Joyce Ave. Outfall	Dup of 71	Downstream Alum Creek	American Ditch Outfall	Upstream Alum Creek
ORGANIC TRAFFIC NO.	EZN 67	EZN 68	EZN 69	EZN 70	EZN 71	EZN 72	EZN 73	EZN 74	EZN 75
INORGANIC TRAFFIC NO.	MEWE 67	MEWE 68	MEWE 69	MEWE 70	MEWE 71	MEWE 72	MEWE 73	MEWE 74	MEWE 75
SEMI-VOLATILE ORGANIC COMPOUNDS	***CRQL***								
phenol	330 ug/kg	210J	690U	5300U	580U	1200J	640J	5000U	15000U	520U
bis(2-chloroethyl)ether	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2-chlorophenol	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
1,3-dichlorobenzene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
1,4-dichlorobenzene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
1,2-dichlorobenzene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2-methylphenol	330 ug/kg	490U	690U	5300U	380J	2100U	1800U	5000U	15000U	520U
2,2-oxybis(1-chloropropane)	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
4-methylphenol	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	4000J	550
n-nitroso-di-n-dipropylamine	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
hexachloroethane	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
nitrobenzene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
isophorone	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2-nitrophenol	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2,4-dimethylphenol	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
bis(2-chloroethoxy)methane	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2,4-dichlorophenol	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
1,2,4-trichlorobenzene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	170J
naphthalene	330 ug/kg	490U	690U	5300U	180J	2100U	1800U	5000U	15000U	91J
4-chloroaniline	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
hexachlorobutadiene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
4-chloro-3-methylphenol	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2-methylnaphthalene	330 ug/kg	490U	690U	5300U	170J	2100U	1800U	5000U	15000U	520U
hexachlorocyclopentadiene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2,4,6-trichlorophenol	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2,4,5-trichlorophenol	800 ug/kg	1200U	1700U	13000U	1500U	5200U	4600U	13000U	38000U	1300U
2-chloronaphthalene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
2-nitroaniline	800 ug/kg	1200U	1700U	13000U	1500U	5200U	4600U	13000U	38000U	1300U
dimethylphthalate	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
acenaphthylene	330 ug/kg	490U	690U	5300U	290J	2100U	1800U	5000U	15000U	520U
2,6-dinitrotoluene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
3-nitroaniline	800 ug/kg	1200U	1700U	13000U	1500U	5200U	4600U	13000U	38000U	1300U
acenaphthene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	2600J	8700J	83J

SAMPLE NUMBERS	SE-67	SE-68	SE-69	SE-70	SE-71	SE-72	SE-73	SE-74	SE-75
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95
DESCRIPTION	Baghouse Pond	Drain Tile	Central Ditch	South Ditch	Joyce Ave. Outfall	Dup of 71	Downstream Alum Creek	American Ditch Outfall	Upstream Alum Creek
ORGANIC TRAFFIC NO.	EZN 67	EZN 68	EZN 69	EZN 70	EZN 71	EZN 72	EZN 73	EZN 74	EZN 75
INORGANIC TRAFFIC NO.	MEWE 67	MEWE 68	MEWE 69	MEWE 70	MEWE 71	MEWE 72	MEWE 73	MEWE 74	MEWE 75
SEMI-VOLATILE ORGANIC COMPOUNDS	***CRQL***								
2,4-dinitrophenol	800 ug/kg	1200U	1700U	13000U	1500U	5200U	4600U	13000U	38000U	1300U
4-nitrophenol	800 ug/kg	1200U	1700U	13000U	1500U	5200U	4600U	13000U	38000U	1300U
dibenzofuran	330 ug/kg	490U	690U	5300U	250J	2100U	1800U	1800J	6500J	76J
2,4-dinitrotoluene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
diethylphthalate	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
4-chlorophenyl-phenyl ether	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
fluorene	330 ug/kg	490U	690U	5300U	310J	2100U	1800U	2900J	9500J	130J
4-nitroaniline	800 ug/kg	1200U	1700U	13000U	1500U	5200U	4600U	13000U	38000U	1300U
4,6-dinitro-2-methylphenol	800 ug/kg	1200U	1700U	13000U	1500U	5200U	4600U	13000U	38000U	1300U
n-nitrosodiphenylamine	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
4-bromophenyl-phenyl ether	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
hexachlorobenzene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
pentachlorophenol	800 ug/kg	1200U	1700U	13000U	800J	5200U	4600U	13000U	38000U	1300U
phenanthrene	330 ug/kg	62J	240J	1800J	3000	1500J	1300J	28000	96000	18000
anthracene	330 ug/kg	490U	690U	5300U	360J	350J	1800U	4100J	13000J	280J
carbazole	330 ug/kg	490U	690U	5300U	370J	2100U	1800U	4000J	14000J	270J
di-n-butylphthalate	330 ug/kg	490U	690U	5300U	82J	330J	1800U	5000U	15000U	120J
fluoranthene	330 ug/kg	98J	350J	5400	3400	3100	2500	36000	120000	3400
pyrene	330 ug/kg	94J	330J	10000	3900	2300	2100	28000	82000	2800
butylbenzylphthalate	330 ug/kg	490U	690U	5300U	170J	2100U	1800U	5000U	15000U	520U
3,3-dichlorobenzidine	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
benzo(a)anthracene	330 ug/kg	490U	110J	10000	1600	1200J	1100J	12000	37000	1200
chrysene	330 ug/kg	72J	170J	13000	2100	1700J	1400J	15000	49000	1900
bis(2-ethylhexyl)phthalate	330 ug/kg	490U	160J	5300U	1500	4300	3500	1200J	2200J	950
di-n-octylphthalate	330 ug/kg	490U	690U	5300U	110J	440J	360J	5000U	15000U	75J
benzo(b)fluoranthene	330 ug/kg	73J	130J	20000	1700	1100J	970J	12000	34000	1400
benzo(k)fluoranthene	330 ug/kg	53J	100J	14000	1300	1200J	950J	10000	33000	1200
benzo(a)pyrene	330 ug/kg	490U	690U	20000	1300	1000J	710J	10000	33000	1400
indeno(1,2,3-cd)pyrene	330 ug/kg	490U	690U	15000	970	1100J	930J	6200	20000	1300
dibenzo(a,h)anthracene	330 ug/kg	490U	690U	5300U	580U	2100U	1800U	5000U	15000U	520U
benzo(g,h,i)perylene	330 ug/kg	490U	690U	7300	1000	380J	500J	2200J	13000J	1400

SAMPLE NUMBERS	SE-67	SE-68	SE-69	SE-70	SE-71	SE-72	SE-73	SE-74	SE-75
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95
DESCRIPTION	Baghouse Pond	Drain Tile	Central Ditch	South Ditch	Joyce Ave. Outfall	Dup of 71	Downstream Alum Creek	American Ditch Outfall	Upstream Alum Creek
ORGANIC TRAFFIC NO.	EZN 67	EZN 68	EZN 69	EZN 70	EZN 71	EZN 72	EZN 73	EZN 74	EZN 75
INORGANIC TRAFFIC NO.	MEWE 67	MEWE 68	MEWE 69	MEWE 70	MEWE 71	MEWE 72	MEWE 73	MEWE 74	MEWE 75

PESTICIDES/PCBs	*CRQL*								
alpha-BHC	1.7 ug/kg	2.5U	3.5U	27U	15U	11U	47U	13U	15U	13U
beta-BHC	1.7 ug/kg	2.5U	3.5U	27U	15U	11U	47U	13U	15U	13U
delta-BHC	1.7 ug/kg	2.5U	3.5U	27U	15U	11U	47U	13U	15U	13U
gamma-BHC (Lindane)	1.7 ug/kg	2.5U	3.5U	27U	15U	11U	47U	13U	15U	13U
heptachlor	1.7 ug/kg	2.5U	3.5U	27U	15U	11U	47U	13U	15U	13U
aldrin	1.7 ug/kg	2.5U	3.5U	27U	15U	11U	47U	13U	15U	13U
heptachlor epoxide	1.7 ug/kg	2.5U	3.5U	27U	15U	11U	47U	13U	15U	13U
endosulfan I	1.7 ug/kg	2.5U	3.5U	31	15U	11U	47U	230DP	540DP	30P
dieldrin	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	25U	30U	26U
4,4-DDE	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	25U	30U	26U
endrin	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	25U	30U	26U
endosulfan II	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	42DP	72	26U
4,4-DDD	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	25U	30U	26U
endosulfan sulfate	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	25U	30U	26U
4,4-DDT	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	25U	34P	26U
methoxychlor	17.0 ug/kg	25U	35U	270U	150U	110U	470U	130U	150U	130U
endrin ketone	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	25U	30U	26U
endrin aldehyde	3.3 ug/kg	4.9U	6.9U	53U	29U	21U	9.2U	25U	30U	26U
alpha-chlordane	1.7 ug/kg	2.5U	3.5U	27U	18	11U	47U	13U	15U	13U
gamma-chlordane	1.7 ug/kg	7.4P	3.5U	27U	15U	11U	47U	13U	15U	13U
toxaphene	170 ug/kg	250U	350U	2700U	1500U	1100U	4700U	1300U	1500U	1300U
aroclor-1016	33 ug/kg	49U	69U	530U	290U	210U	920U	250U	300U	260U
aroclor-1221	67 ug/kg	99U	140U	1100U	590U	420U	1900U	510U	610U	520U
aroclor-1232	33 ug/kg	49U	69U	530U	290U	210U	920U	250U	300U	260U
aroclor-1242	33 ug/kg	49U	69U	530U	290U	210U	920U	250U	300U	260U
aroclor-1248	33 ug/kg	49U	69U	530U	290U	210U	920U	250U	300U	260U
aroclor-1254	33 ug/kg	49U	69U	530U	290U	210U	920U	250U	300U	260U
aroclor-1260	33 ug/kg	49U	69U	530U	290U	210U	920U	250U	300U	260U

SAMPLE NUMBERS	SE-67	SE-68	SE-69	SE-70	SE-71	SE-72	SE-73	SE-74	SE-75
DATE SAMPLE COLLECTED	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95	4/11/95
DESCRIPTION	Baghouse Pond	Drain Tile	Central Ditch	South Ditch	Joyce Ave Outfall	Dup of 71	Downstream Alum Creek	American Ditch Outfall	Upstream Alum Creek
ORGANIC TRAFFIC NO.	EZN 67	EZN 68	EZN 69	EZN 70	EZN 71	EZN 72	EZN 73	EZN 74	EZN 75
INORGANIC TRAFFIC NO.	MEWE 67	MEWE 68	MEWE 69	MEWE 70	MEWE 71	MEWE 72	MEWE 73	MEWE 74	MEWE 75
TAL METALS/CYANIDE	***CRDL***								
aluminum	40 mg/kg	8660	10300	3940	2980	15000	11400	3740	6310	6980
antimony	12 mg/kg	3.3U	10.1B	5.0U	5.0U	14.2U	13.3U	3.6U	4.5U	3.9U
arsenic	2 mg/kg	19.2	13.9	7.4	10.7	15.2	10B	8.6	11	12.6
barium	40 mg/kg	94.8	108	36.1B	102	110B	107B	61.4B	88.2	103
beryllium	1 mg/kg	0.70B	0.87B	0.41B	0.21B	1.1B	0.80B	0.39B	0.55B	0.57B
cadmium	1 mg/kg	26.9	444	236	13.8	1110	936	2.4	4.1	0.72U
calcium	1000 mg/kg	35800	6270	5950	14400	93000	100000	31500	35800	28800
chromium	2 mg/kg	12.5	17.5	8.6	6	22.5	18.8	9.5	14	12.9
cobalt	10 mg/kg	14.1B	15.7B	5.9B	2.1B	22.1B	16.9B	7.8B	9.8B	10.8B
copper	5 mg/kg	52.8	271	98.8	30.9	115	96.7	22.8	31.2	30.5
iron	20 mg/kg	25000	25200	10000	6400	22400	20200	13900	18000	19500
lead	0.6 mg/kg	27.9	60.2	159	116	397	317	33.6	48.9	38.8
magnesium	1000 mg/kg	15000	3970	2950	559B	14600	14700	10400	11200	10400
manganese	3 mg/kg	278	381	66.2	17.2	596	563	252	427	420
mercury	0.1 mg/kg	1.9	1.2	0.65	11	3.4	1.2	0.33	0.34	0.28
nickel	8 mg/kg	39.7	49.8	18.4	5.5B	59.4	48.0B	19.6	25.9	28.1
potassium	1000 mg/kg	16.7	1930B	873B	1210B	1520B	1040B	925B	1380B	1480B
selenium	1 mg/kg	0.75U	2.7	1.1U	2.4	3.2U	3.0U	0.82U	1.0U	0.89U
silver	2 mg/kg	0.75U	1.2U	1.1U	1.1U	3.2U	3.0U	0.82U	1.0U	0.89U
sodium	1000 mg/kg	160B	185B	141B	158B	736B	673B	150B	202B	189B
thallium	2 mg/kg	0.87U	1.6B	1.3U	1.3U	3.7U	3.5U	0.95U	1.2U	1.0U
vanadium	10 mg/kg	23.1	28.1	9.5B	7.8B	23.3B	19.2B	12.5B	15.6B	21.1
zinc	4 mg/kg	5160	110000	20200	750	52000	38500	205	358	160
cyanide	2 mg/kg	3.7U	5.9U	5.7U	5.6U	16.1U	15.1U	4.1U	5.1U	4.5U

Appendix B

GPS Coordinates of Sample Locations

Soil Samples

EZN\MEWE 59 & 65(duplicate)
GPS 39° 59' 52.5" N; 82° 58' 07.1' W
EPE 86'

EZN\MEWE 58
GPS 39° 59' 40.7" N; 82° 58' 07.1'W
EPE 95'

EZN\MEWE 60 (surface) & 86 (subsurface)
GPS 39° 59' 46.8" N; 82° 58' 04.3 W
EPE 82'

EZN\MEWE 61 (surface)& 62 (subsurface)
GPS 39° 59' 41.8" N; 82° 58' 12.9W
No EPE

EZN\MEWE 63 (surface) & 64 (subsurface)
No GPS

EZN\MEWE 66
No GPS

Surface Water/Sediment Samples

EZN\MEWE 78 (sw) & 69 (sd)
GPS 39° 59' 45.0" N; 82° 58' 00.1" W
No EPE
pH: 7.0

EZN\MEWE 79 (sw) & 70 (sd) -South Ditch
GPS 39° 59' 46.0" N; 82° 57' 59.8" W
EPE 92'
pH: 7.5

EZN\MEWE 71 & 72 (duplicate)
No GPS

EZN\MEWE 76
GPS 39° 59' 37.6" N; 82° 5'8 03.1"W
EPE 256'
pH:8.1

EZN\MEWE 77 (sw) & 67 (sd)
GPS 39° 59' 40.9" N; 82° 58' 14.0" W
EPE 221'
pH: 7.5

EZN\MEWE 68
GPS 39° 59' 40.3" N; 82° 58' 01.7"W
EPE 86'

EZN\MEWE 73
No GPS

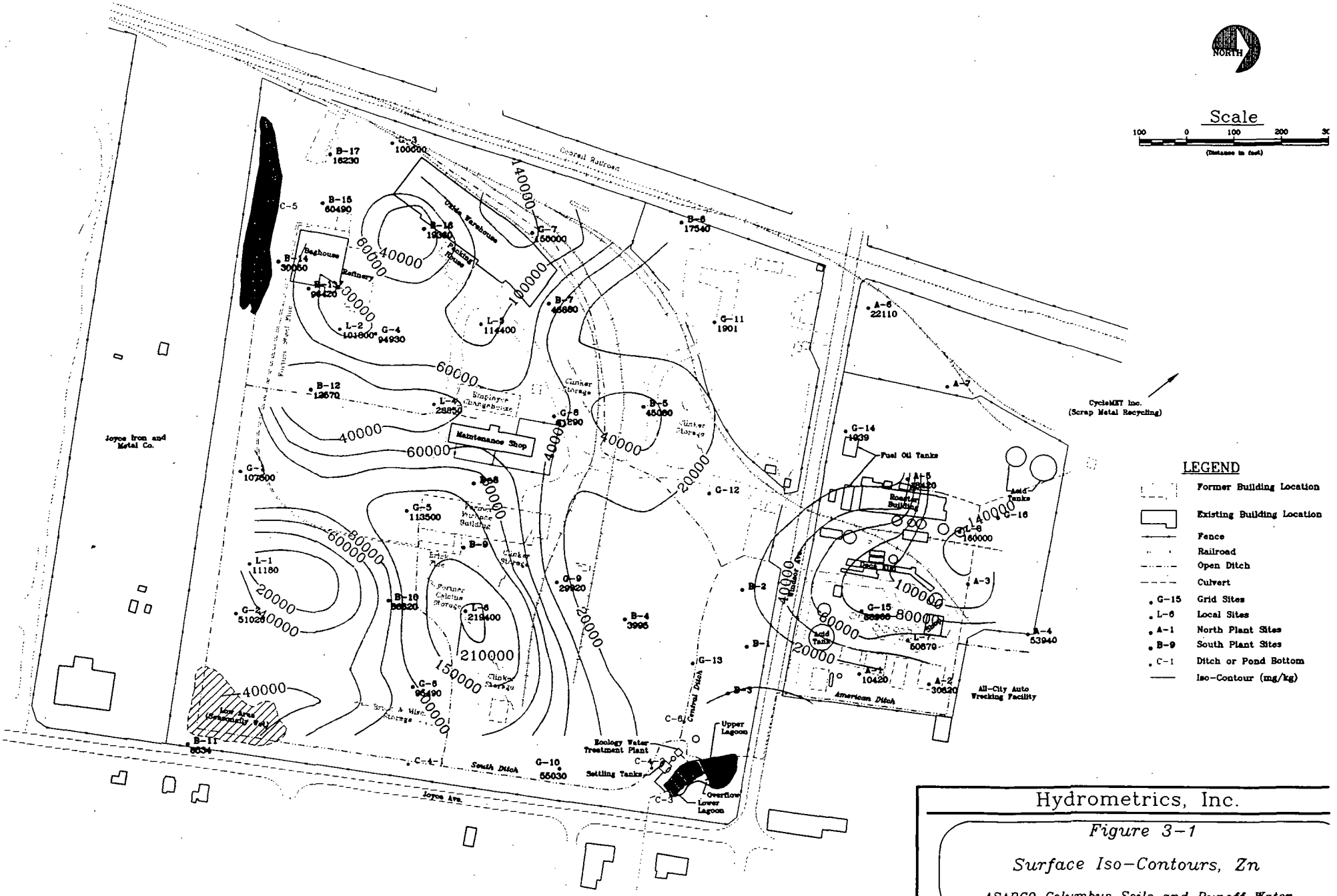
EZN\MEWE 83 (sw) & 74 (sd)
No GPS
pH 7.8
Temp 8.3°C
Conductivity 0.94 mu/cm

EZN\MEWE 75(sd) & 84 (sw)
No GPS
pH 7.8
Temp 11.1°C
Conductivity 0.61 mu/cm

EZN\MEWE 80 & 81(duplicate) - Lagoon Outfall -Water
No GPS
pH 9.1
Temp 17.6°C
Conductivity 1.2 mu/cm

Appendix C

Site Contour Maps for Zinc and Cadmium



Hydrometrics, Inc.

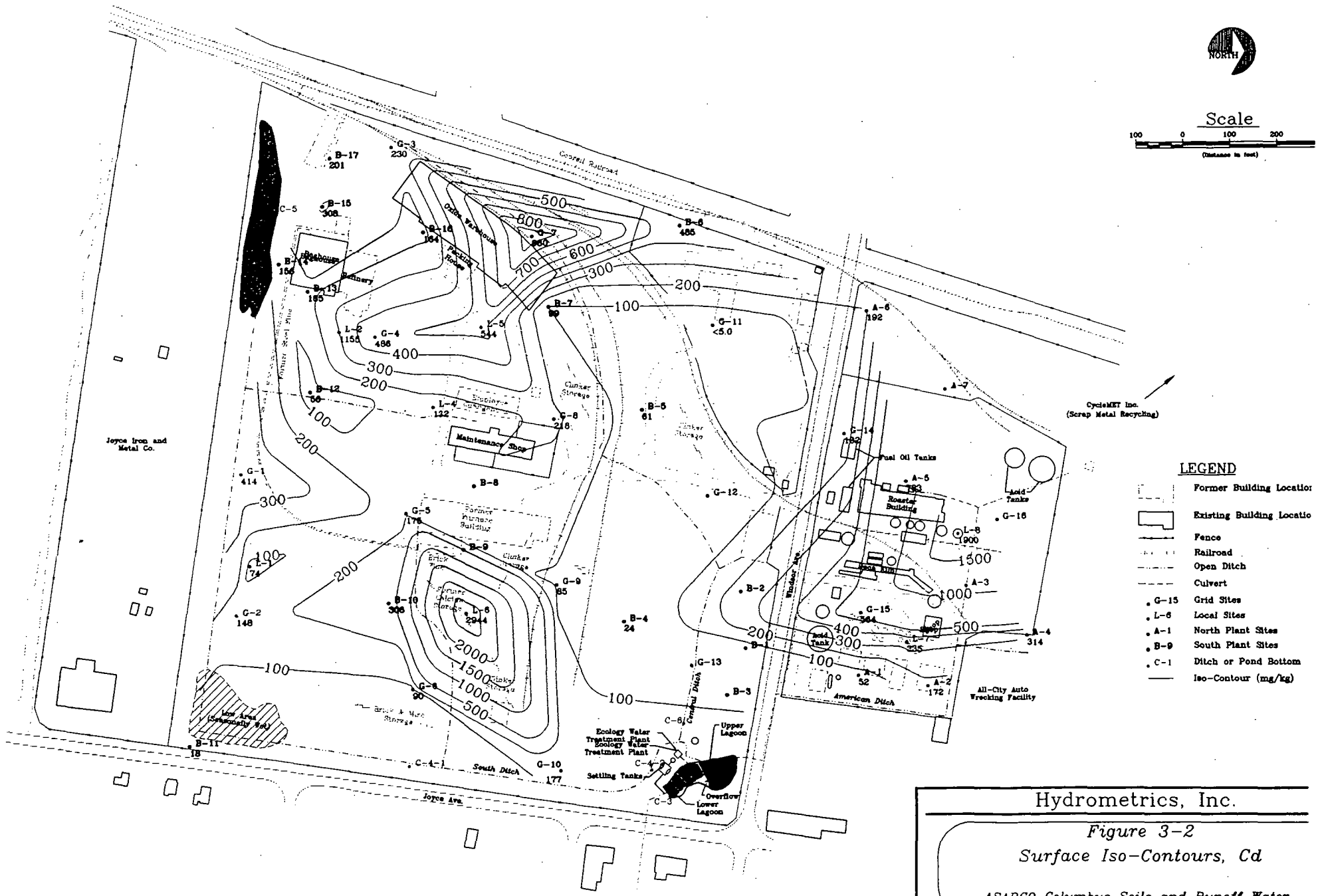
Figure 3-1

Surface Iso-Contours, Zn

ASARCO Columbus Soils and Runoff Water
Columbus, Ohio

ASC002
03894004
03894001

Drawn By: MAS
Last Update: 11/11/94 SDP



Hydrometrics, Inc.

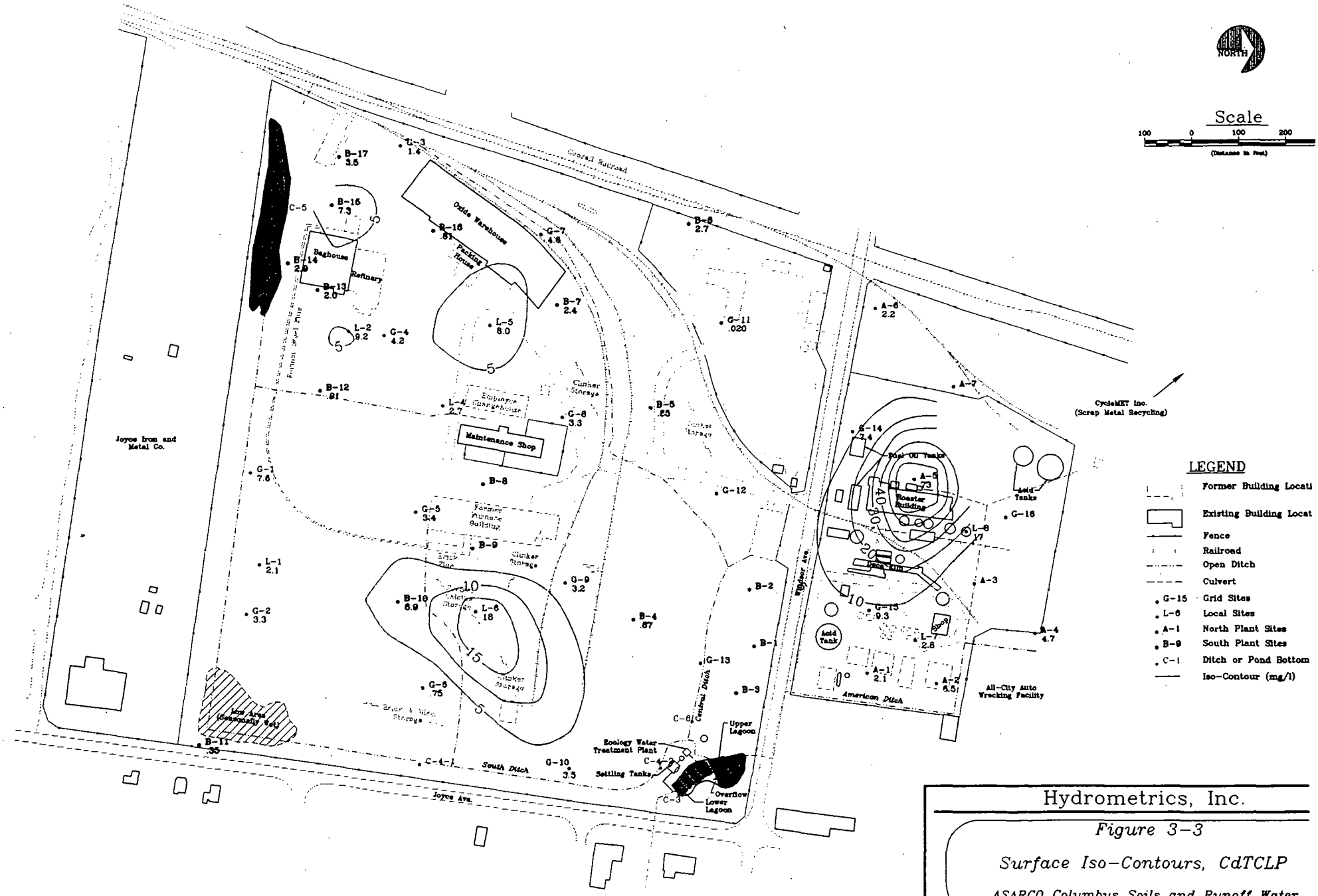
Figure 3-2

Surface Iso-Contours, Cd

ASARCO Columbus Soils and Runoff Water
Columbus, Ohio

No: ASC002
No: 03894003
Dwg: 03894001

Drawn By: MAS
Last Update: 11/11/94 SDP



Hydrometrics, Inc.

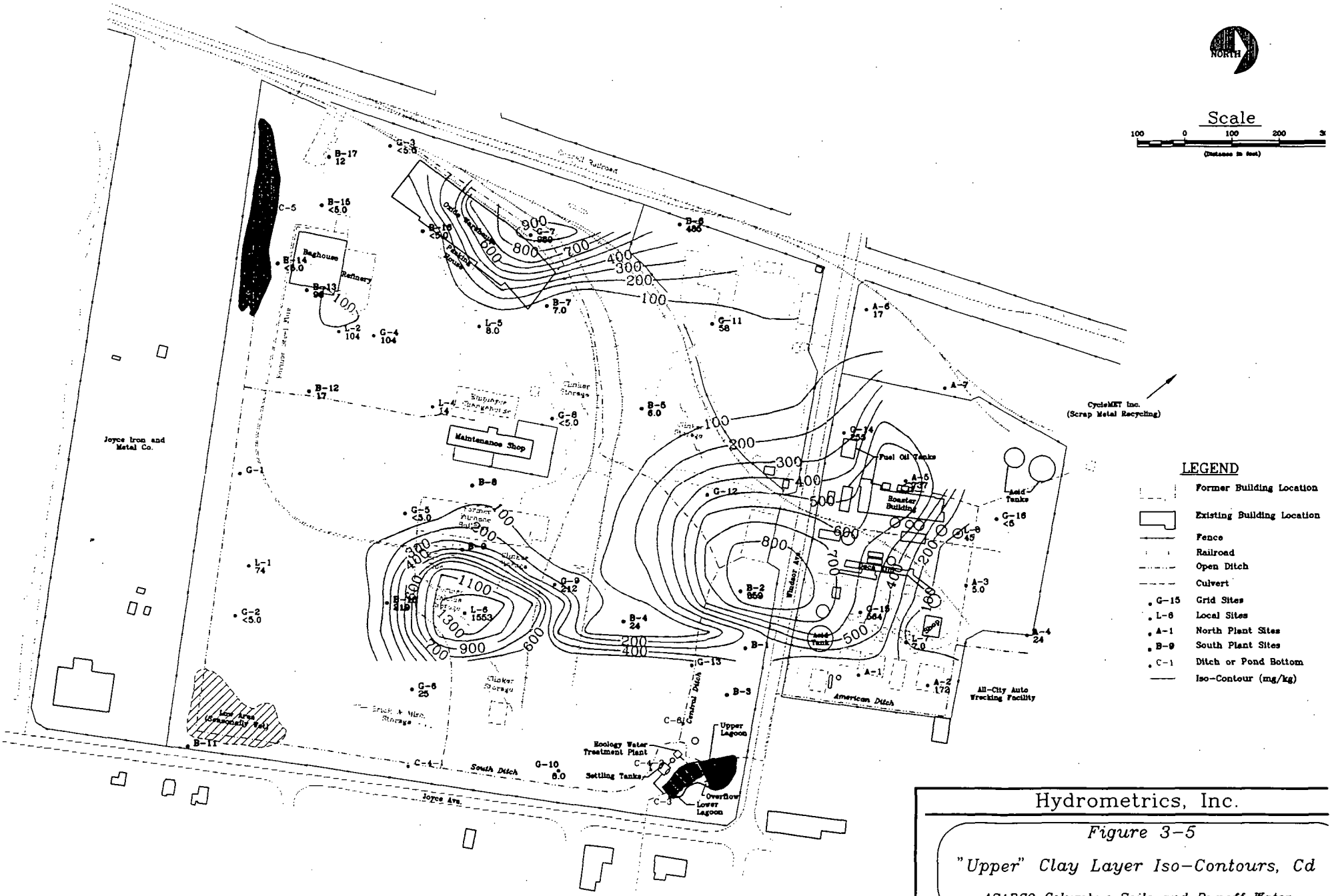
Figure 3-3

Surface Iso-Contours, CdTCLP

ASARCO Columbus Soils and Runoff Water
Columbus, Ohio

No: ASC002
No: 03894005
Dwg: 03894001

Drawn By: MAS
Last Update: 11/14/94 SDP



Hydrometrics, Inc.

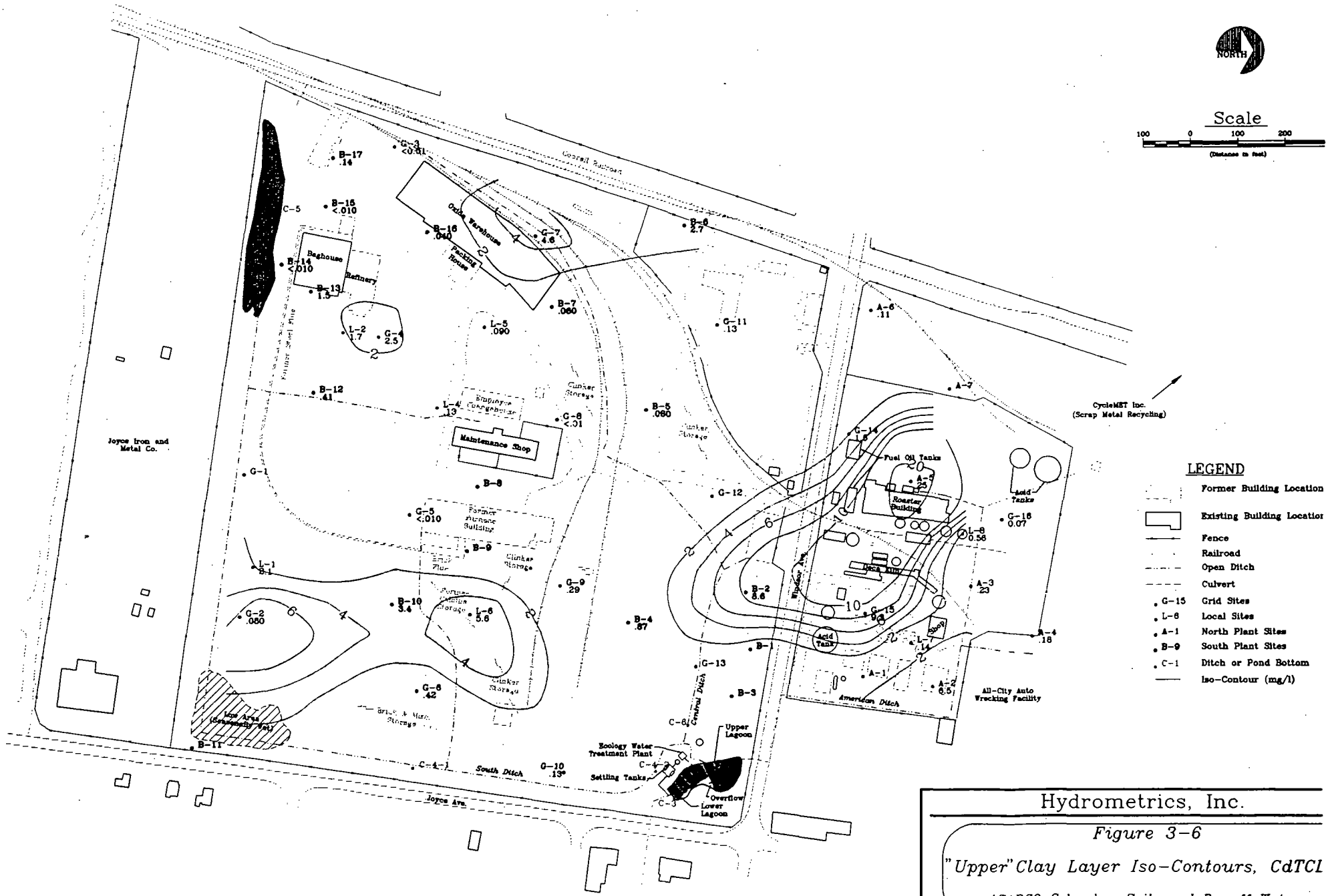
Figure 3-5

"Upper" Clay Layer Iso-Contours, Cd

ASARCO Columbus Soils and Runoff Water
Columbus, Ohio

ASC002
03894006
03894001

Drawn By: MAS
Last Update: 11/14/94 SDP



Hydrometrics, Inc.

Figure 3-6

"Upper" Clay Layer Iso-Contours, CdTCl

ASARCO Columbus Soils and Runoff Water
Columbus, Ohio

Job: ASC002
Proj: 03894008
Dwg: 03894001

Drawn By: MAS
Last Update: 11/14/94 SDP

Appendix D

Site Photographic Log

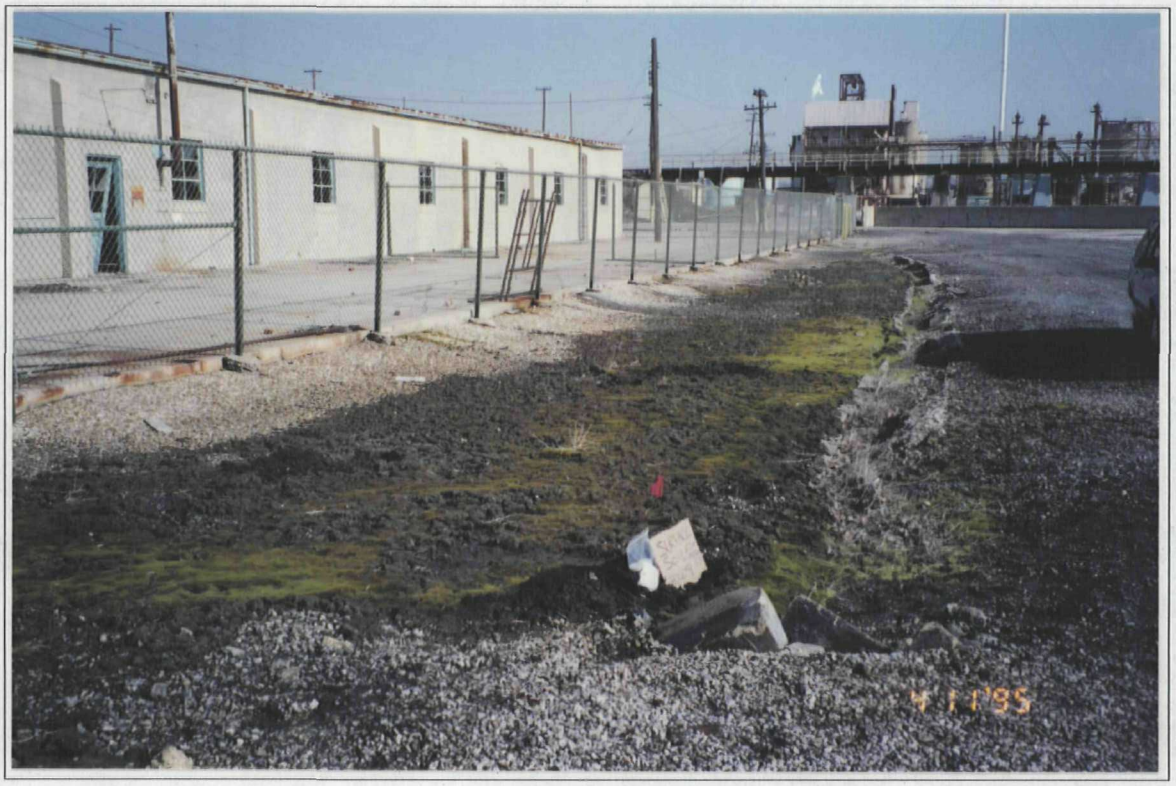


Photo No: 1 **Sample No:** SO-58 **Date:** April 11, 1995
Orientation: North
Description: A surface soil sample collected in a low lying area on the southeast corner of the Maintenance Building.

Photo No: 2 **Sample No:** SO-58 **Date:** April 11, 1995
Orientation: North
Description: A close up view of the above soil sample.

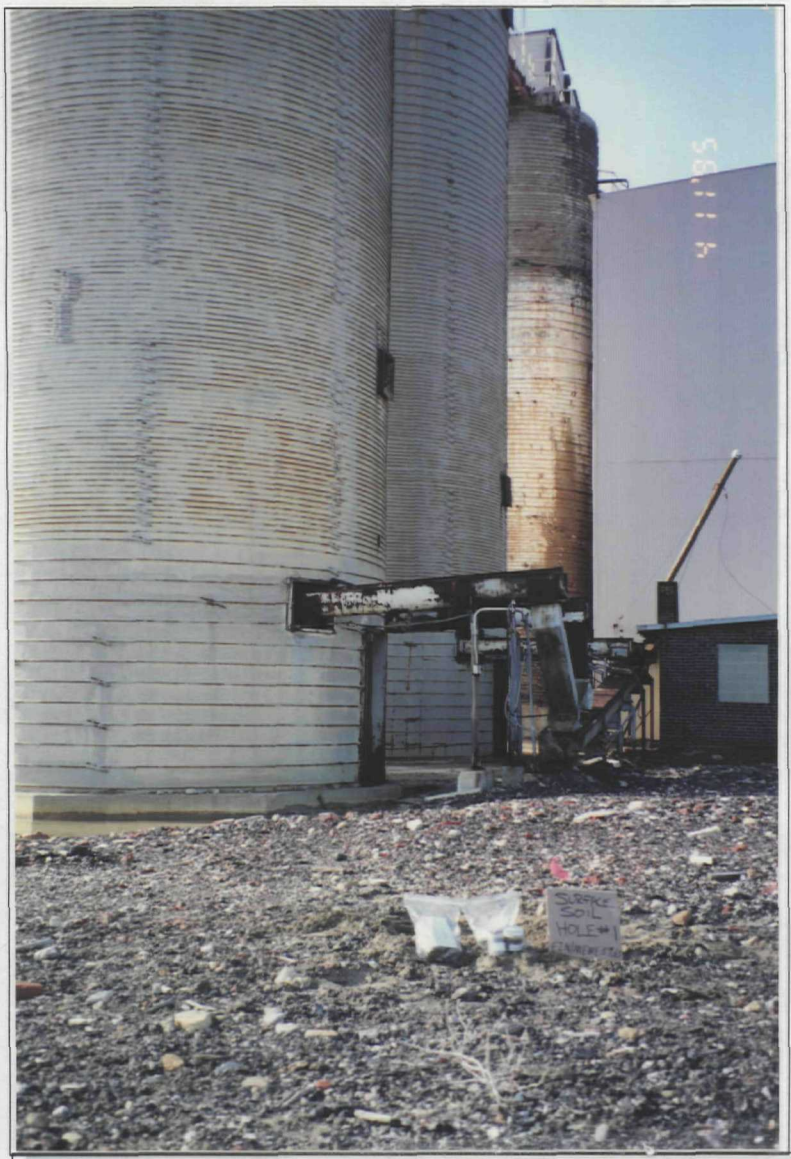


Photo No: 3
Sample No. SO-59, SO-65
Date: April 11, 1995
Orientation: South
Description: Surface soil sample and duplicate collected north of the Roaster Building. Note the heavy layer of clinker covering the area.

Photo No: 4
Sample No: SO-60
Date: April 11, 1995
Orientation: East
Description: Surface soil sample collected west of a large mound, south of Windsor Ave.

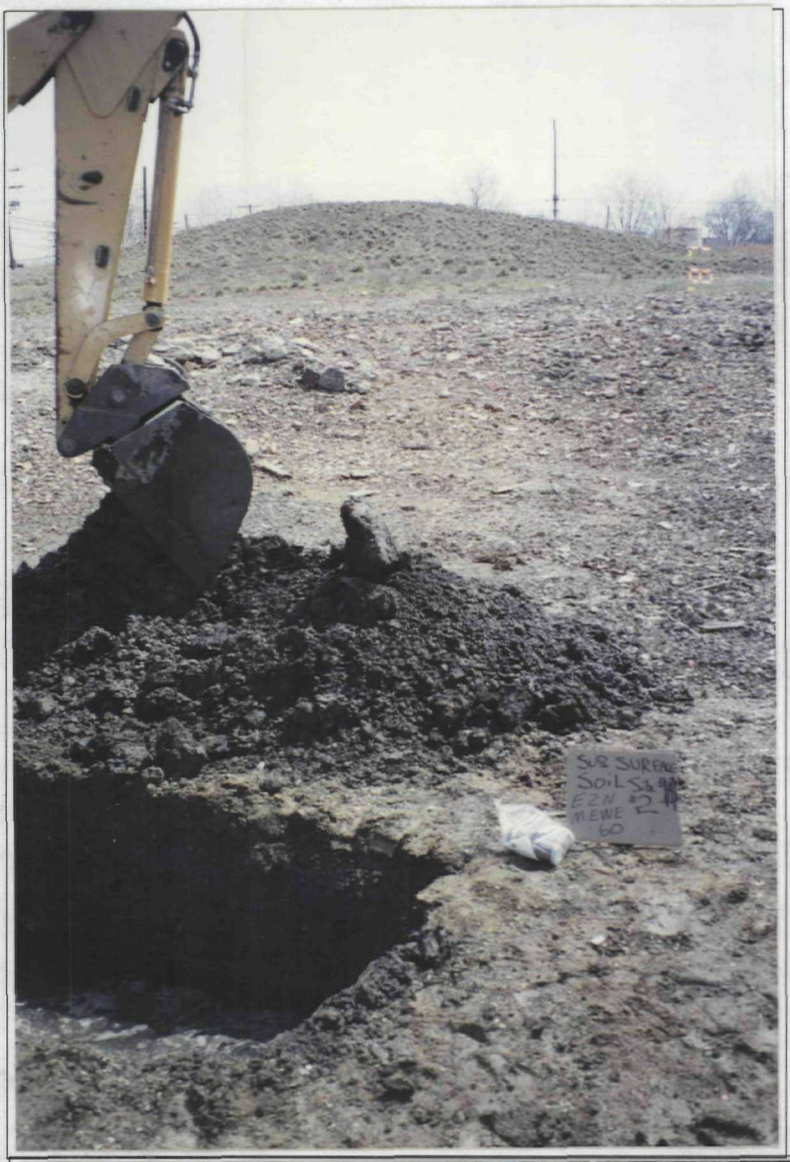


Photo No: 5
Sample No. SO-86
Date: April 11, 1995
Orientation: East
Description: Sub-surface soil sample collected at the same location as SO-60. Note that the sample number in the picture is incorrect.

Photo No: 6
Sample No: SO-86
Date: April 11, 1995
Orientation: East
Description: The excavation by the backhoe for sample SO-86. Water collected in the hole immediately.

Photo No: 7 **Sample No:** SO-61 **Date:** April 11, 1995
Orientation: Northwest
Description: A surface soil sample collected behind the oxide warehouse.

Photo No: 8 **Sample No:** SO-62 **Date:** April 11, 1995
Orientation: North
Description: A deeper sample collected at the same location behind the oxide warehouse.

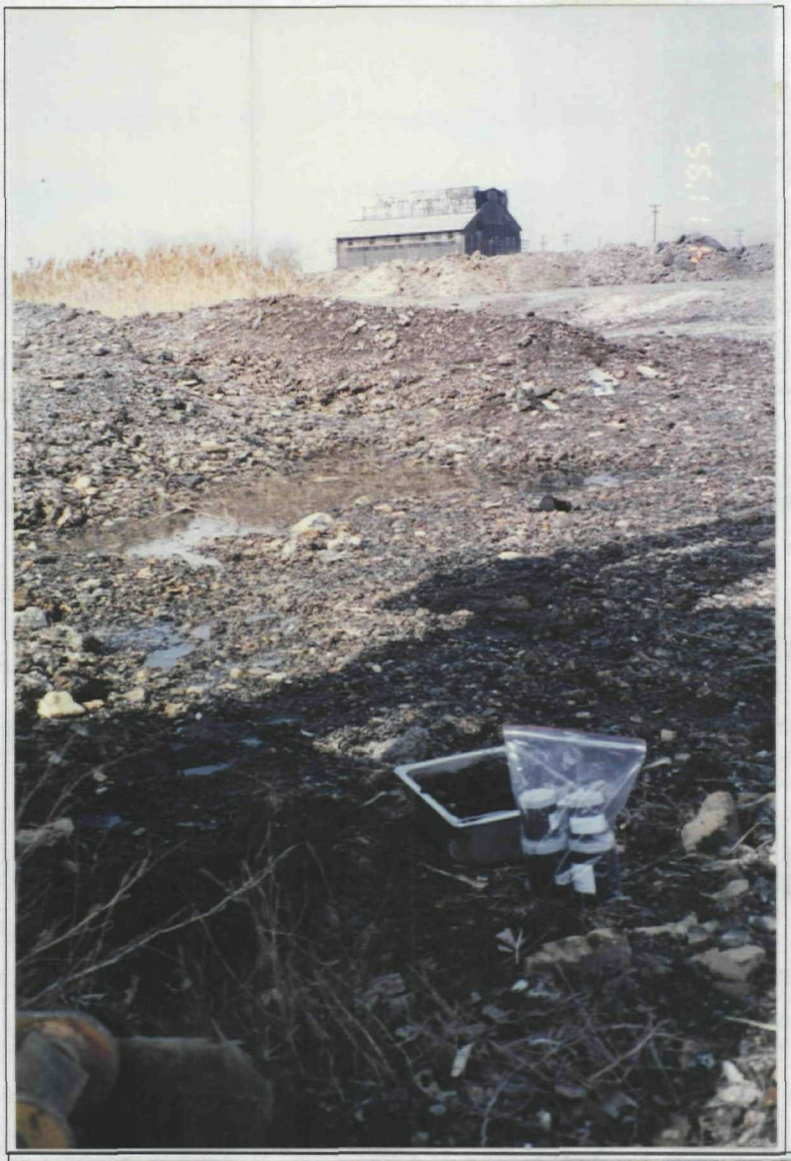


Photo No: 9
Sample No. SO-63
Date: April 11, 1995
Orientation: East
Description: The shallow soil sample location noted as south of the rail trestle.

Photo No: 10
Sample No: SO-64
Date: April 11, 1995
Orientation: West
Description: The excavation by the backhoe for deep sample SO-64 also collected south of the rail trestle.

Photo No: 11 **Sample No:** SO-66 **Date:** April 11, 1995
Orientation: Northwest
Description: The background soil sample collected at Nelson Park southeast of the site.

Photo No: 12 **Sample No:** SE-69 **Date:** April 11, 1995
Orientation: North
Description: The sediment sample collected in the Central Ditch.

Photo No: 13 **Sample No:** SE-70, SW-78 **Date:** April 11, 1995
Orientation: Northeast
Description: The Central Ditch weir where a sediment and a surface water sample was collected.

Photo No: 14 **Sample No:** SW-80 **Date:** April 11, 1995
Orientation: East
Description: The water treatment plant effluent being released to the Joyce Avenue outfall.

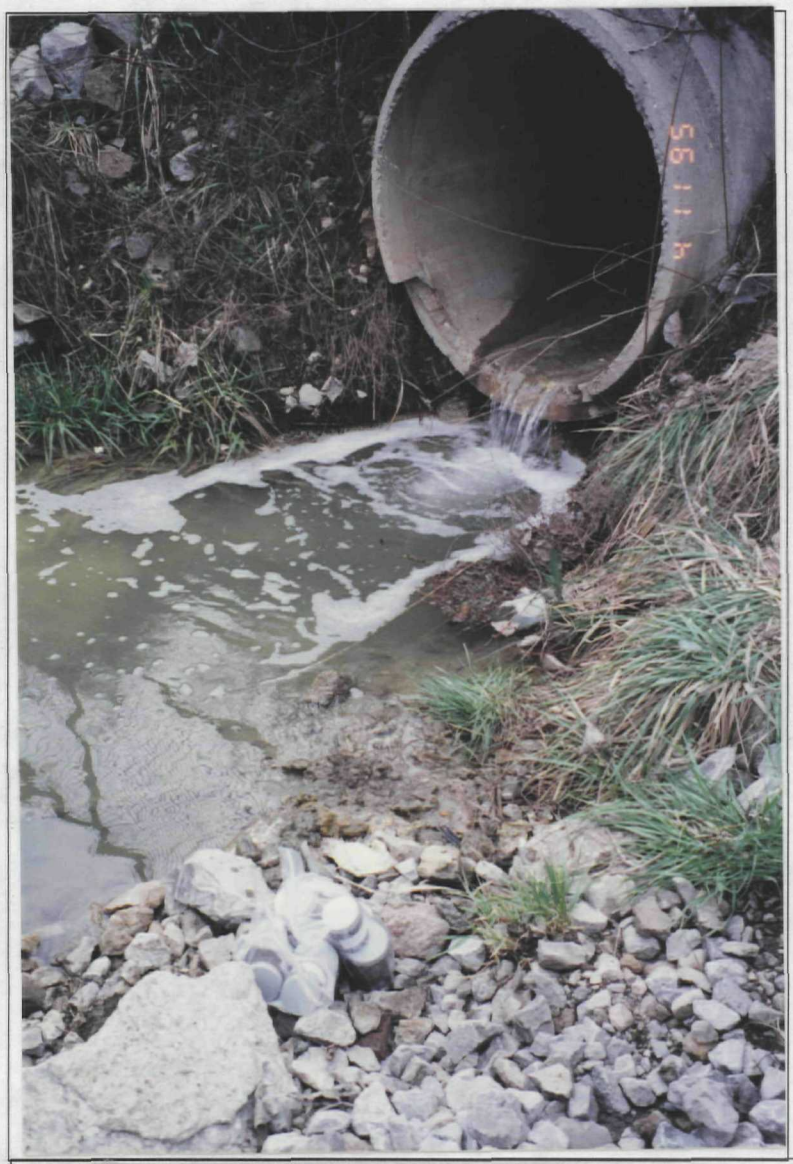


Photo No: 15
Sample No. SE-71, SE-72(dup)
Date: April 11, 1995
Orientation: Southwest
Description: The Joyce Avenue outfall between the site and Joyce Avenue where the sediment sample was collected.

Photo No: 16
Sample No: -
Date: April 11, 1995
Orientation: East
Description: Another view of the above sample location looking under Joyce Avenue.

Photo No: 17 **Sample No:** SW-76 **Date:** April 11, 1995
Orientation: South
Description: The seasonally wet area on the southeast corner of the site.

Photo No: 18 **Sample No:** SE-68 **Date:** April 11, 1995
Orientation: West
Description: The sediment sample collected at the drain tile.

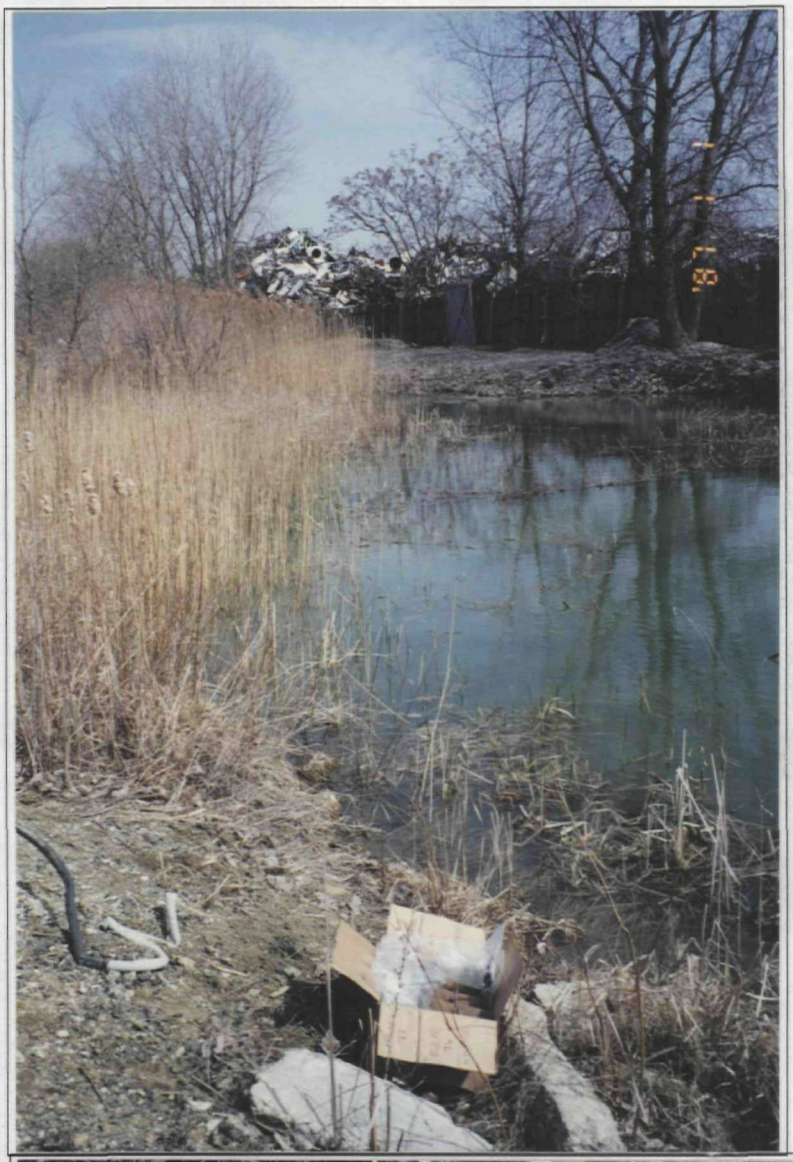


Photo No: 19
Sample No. SW-77
Date: April 11, 1995
Orientation: Southeast
Description: The Baghouse Pond located on the southwest corner of the site.

Photo No: 20
Sample No: SE-67
Date: April 11, 1995
Orientation: -
Description: The Baghouse Pond sediment sample.

Photo No: 21
Sample No. SW-77
Date: April 11, 1995
Orientation: Southeast
Description: The Baghouse Pond surface water sample.

Photo No: 22
Sample No:SW-83, SE-74
Date: April 11, 1995
Orientation: -
Description: The American Ditch outfall into Alum Creek.

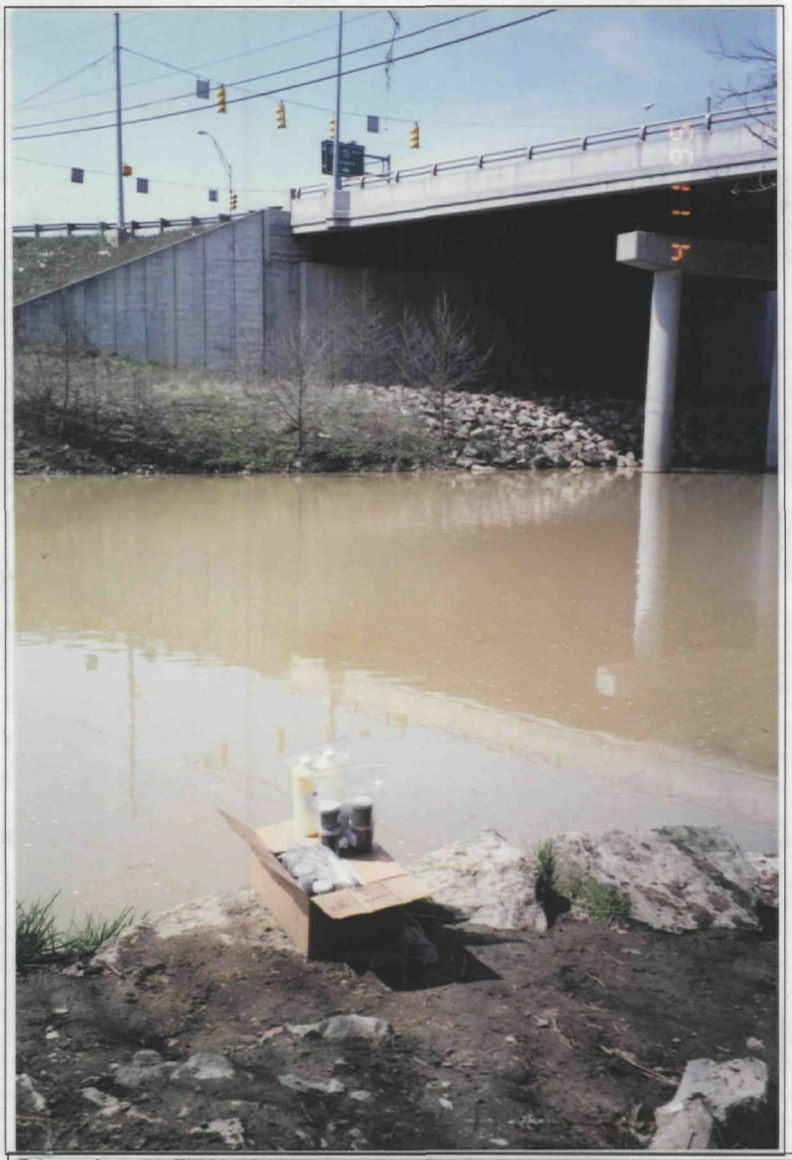


Photo No: 23
Sample No. SW-84, SE-75
Date: April 11, 1995
Orientation: Northwest
Description: The upstream Alum Creek sediment and surface water samples.

Photo No: 24
Sample No: SE-73
Date: April 11, 1995
Orientation: East
Description: The downstream Alum Creek sediment sample.

Appendix E

Four-Mile Radius Map

SDMS US EPA Region V

Imagery Insert Form

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Four Mile Radius Map

☐ Document is available at the EPA Region 5 Records Center.

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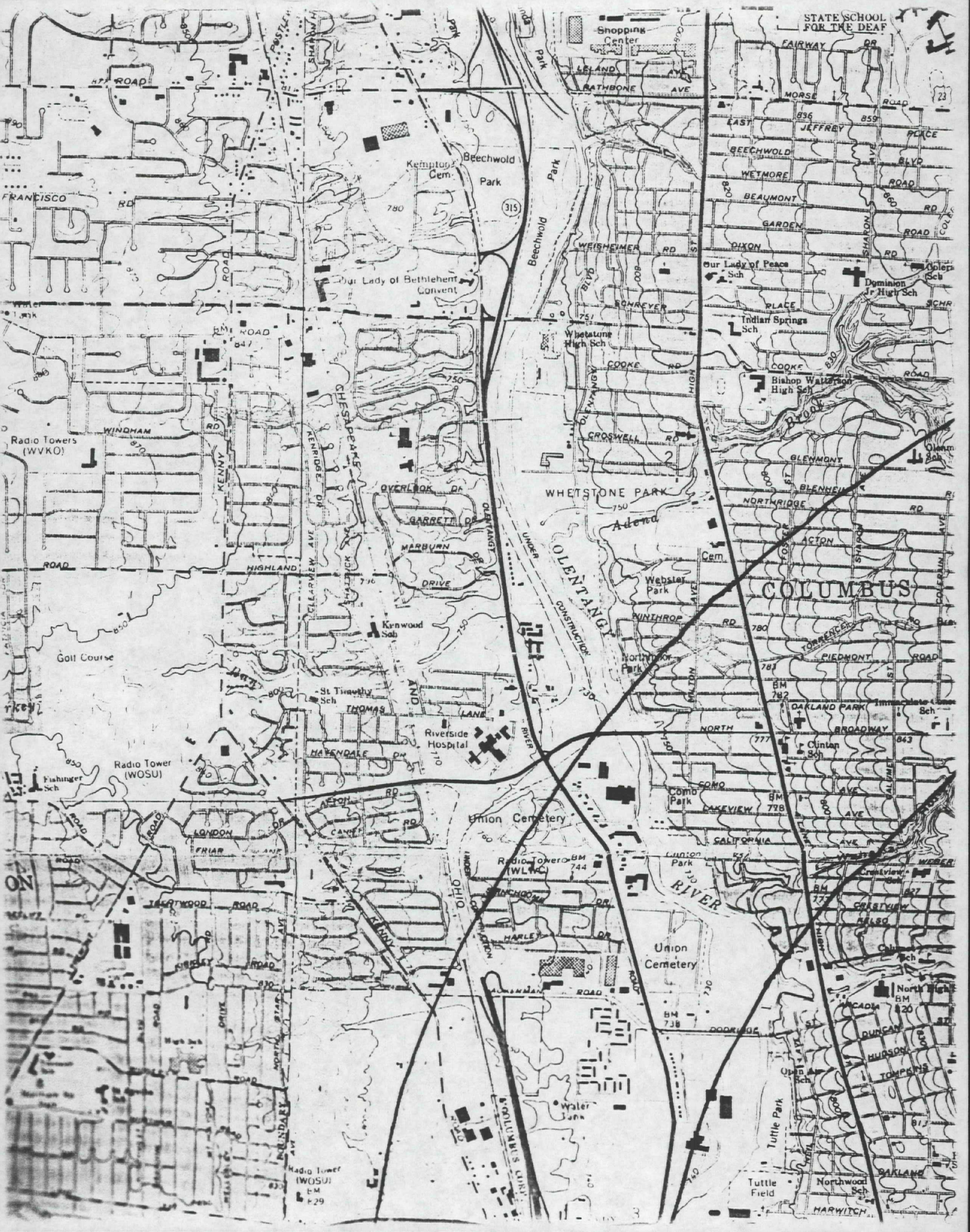
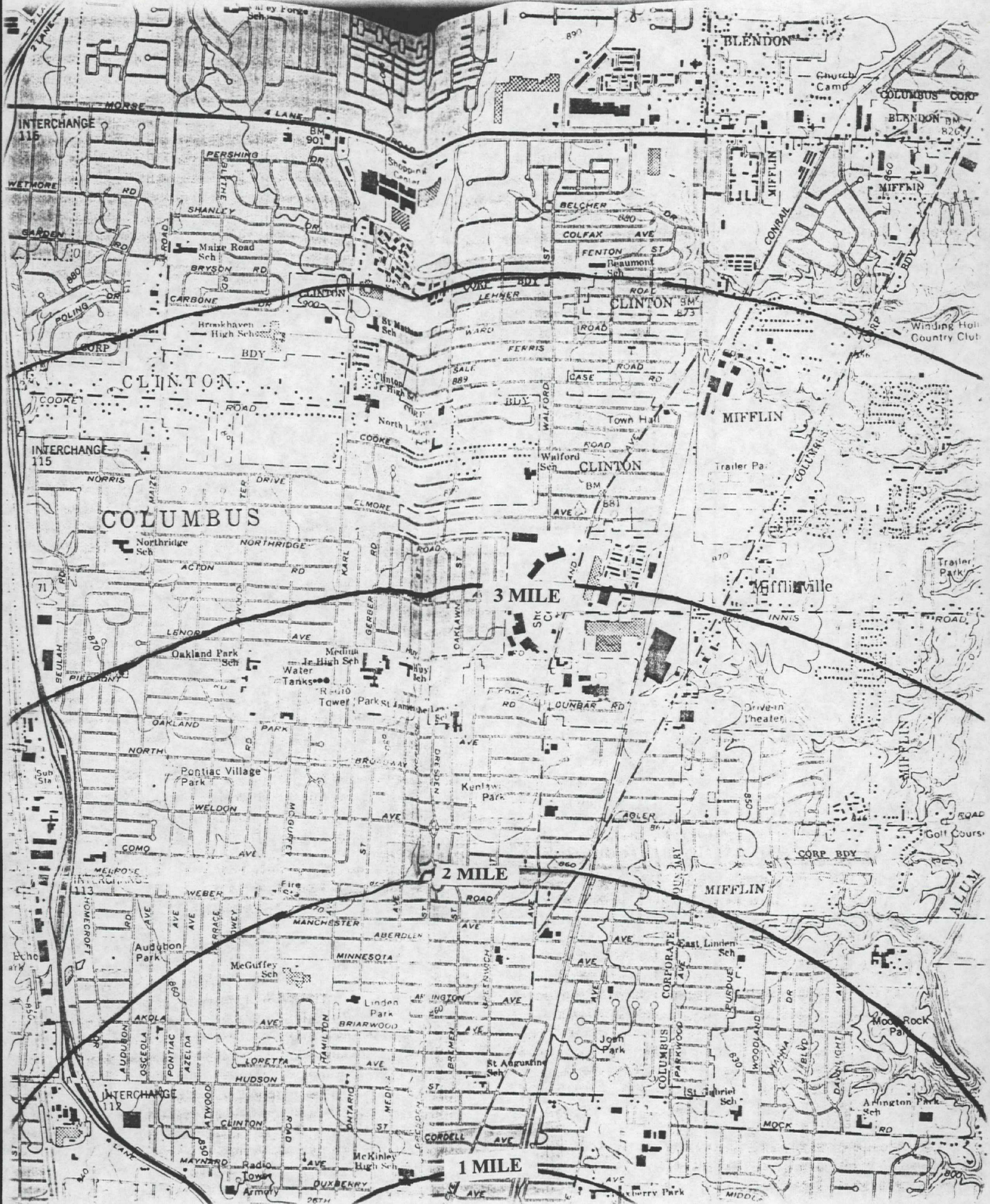
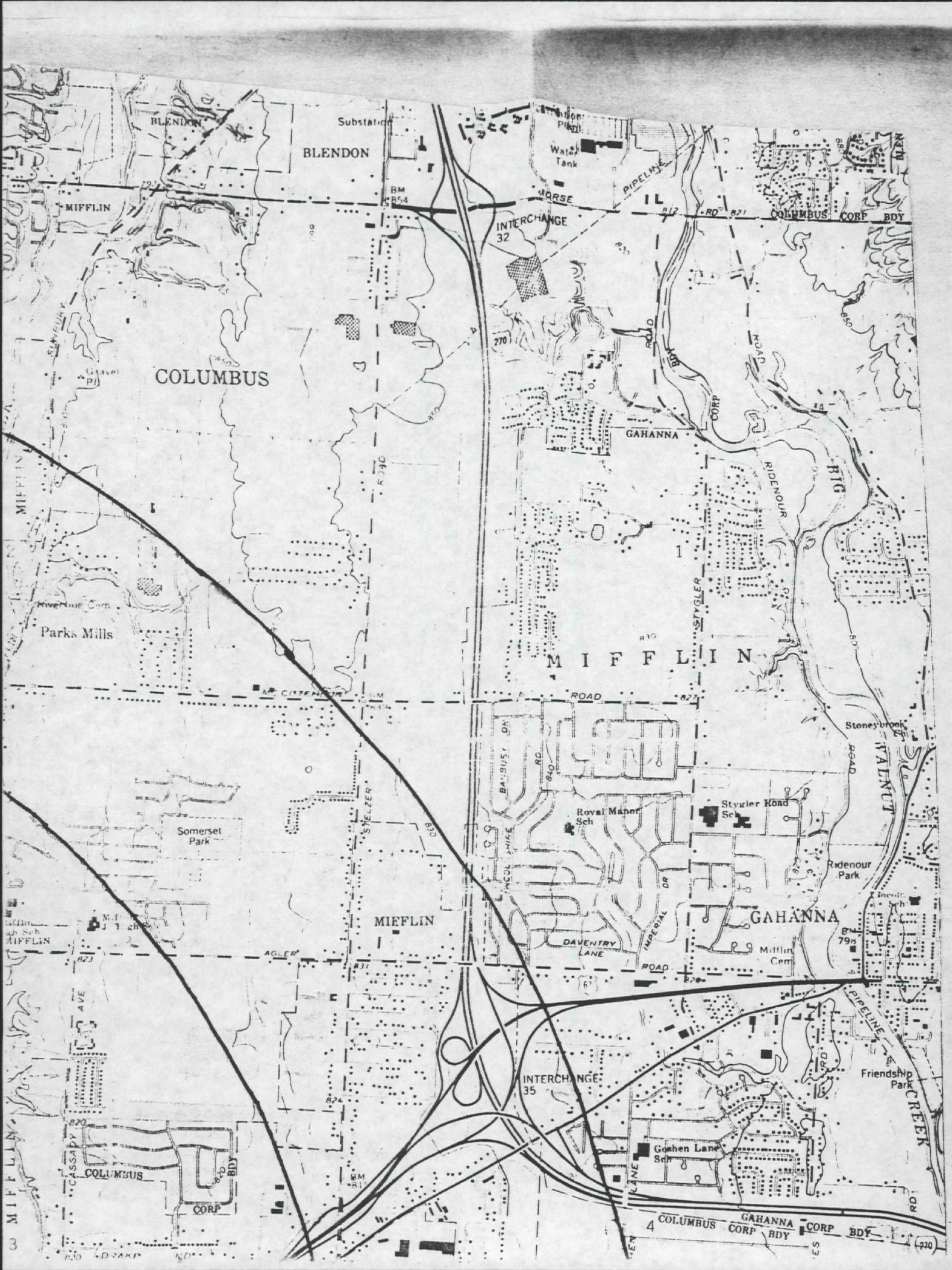
Appendix E

Four-Mile Radius Map


STATE SCHOOL FOR THE DEAF
Shopping Center
COLUMBUS
OLENTANGY
RIVER
WHETSTONE PARK
Beechwold Park
Kempton Cem
Our Lady of Bethlehem Convent
Our Lady of Peace Sch
Dominion Jr High Sch
Indian Springs Sch
Whetstone High Sch
Bishop Watterson High Sch
Kenwood Sch
St Timothy Sch
Riverside Hospital
Union Cemetery
Radio Towers (WVKO)
Radio Tower (WOSU)
Radio Tower (WLWC)
Fishinger Sch
Golf Course
Webster Park
Como Park
Clinton Sch
Tuttle Park
Tuttle Field
Northwood Sch
Open Air Sch
North High
Water Tank
HIGHLAND ROAD
KENNY ROAD
CHESAPEAKE
OLENTANGY
WINDHAM
FRANCISCO RD
MORSE ROAD
BEECHWOLD
WETMORE
BEAUMONT
GARDEN
DIXON
WEISHEIMER RD
SCHREYER
COOKE RD
CROSWELL RD
GLENMONT
BLENHEIM
NORTHRIDGE RD
ACTON
WINTHROP RD
PIEDMONT ROAD
OAKLAND PARK
BROADWAY
NORTH
COMO
LAKEVIEW
CALIFORNIA
CRESTVIEW
KELSO
DUNCAN
HUDSON
TOMPKINS
OAKLAND
HARWICH
LONDON
FRIAR
HAVENDALE DR
THOMAS
OVERLOOK DR
GARRETT DR
MARBURN DR
DRIVE
ACKERMAN ROAD
DODRIDGE
HARLEY DR
NORTH STAR
BOUNDARY
LELAND
RATHBONE AVE
SHARON
COLERAIN
UNDER CONSTRUCTION
COLUMBUS CORP



BLENDON
Church Camp
COLUMBUS CORP
BLENDON
MORSE ROAD
4 LANE
INTERCHANGE 116
PERSHING DR
Shopping Center
WETMORE RD
SHANLEY DR
GARDEN RD
BELCHER DR
COLFAX AVE
FENTON ST
Maize Road Sch
BRYSON RD
Beaumont Sch
CARBONE DR
POLING DR
CLINTON
LEHNER
CLINTON
CONRAIL
MIFFLIN
St Matthias Sch
WARD
Brookhaven High Sch
FERRIS
Winding Hollow Country Club
CORP BDY
CLINTON
CASE RD
COOKE ROAD
Town Hall
MIFFLIN
INTERCHANGE 115
COOKE
ROAD
Walford Sch
CLINTON
Trailer Park
NORRIS DRIVE
COLUMBUS
ELMORE
Northridge Sch
NORTHRIDGE
ROAD
ACTON RD
Trailer Park
Mifflinville
3 MILE
INNIS ROAD
LENORE AVE
Oakland Park Sch
Medina Jr High Sch
Water Tanks
Radio Tower
Park
PIEDMONT
DUNBAR RD
Drive-in Theater
OAKLAND PARK
NORTH
BROADWAY
Pontiac Village Park
Kenlawn Park
WELDON
AVE
MIFFLIN
ADLER
ROAD
Golf Course
COMO AVE
CORP BDY
2 MILE
INTERCHANGE 113
WEBER ROAD
MIFFLIN
ALUM
MANCHESTER AVE
ABERDEEN
East Linden Sch
Audubon Park
MINNESOTA
McGuffey Sch
ARLINGTON AVE
Linden Park
BRIARWOOD AVE
Moon Rock Park
Joan Park
LORETTA AVE
HUDSON
St Augustine Sch
COLUMBUS
CORPORATE
St Gabriel Sch
INTERCHANGE 112
Arlington Park Sch
CLINTON
MOCK RD
CORDELL AVE
MAYNARD AVE
Radio Tower
Armory
McKinley High Sch
1 MILE
DUXBERRY
26TH AVE
Duxberry Park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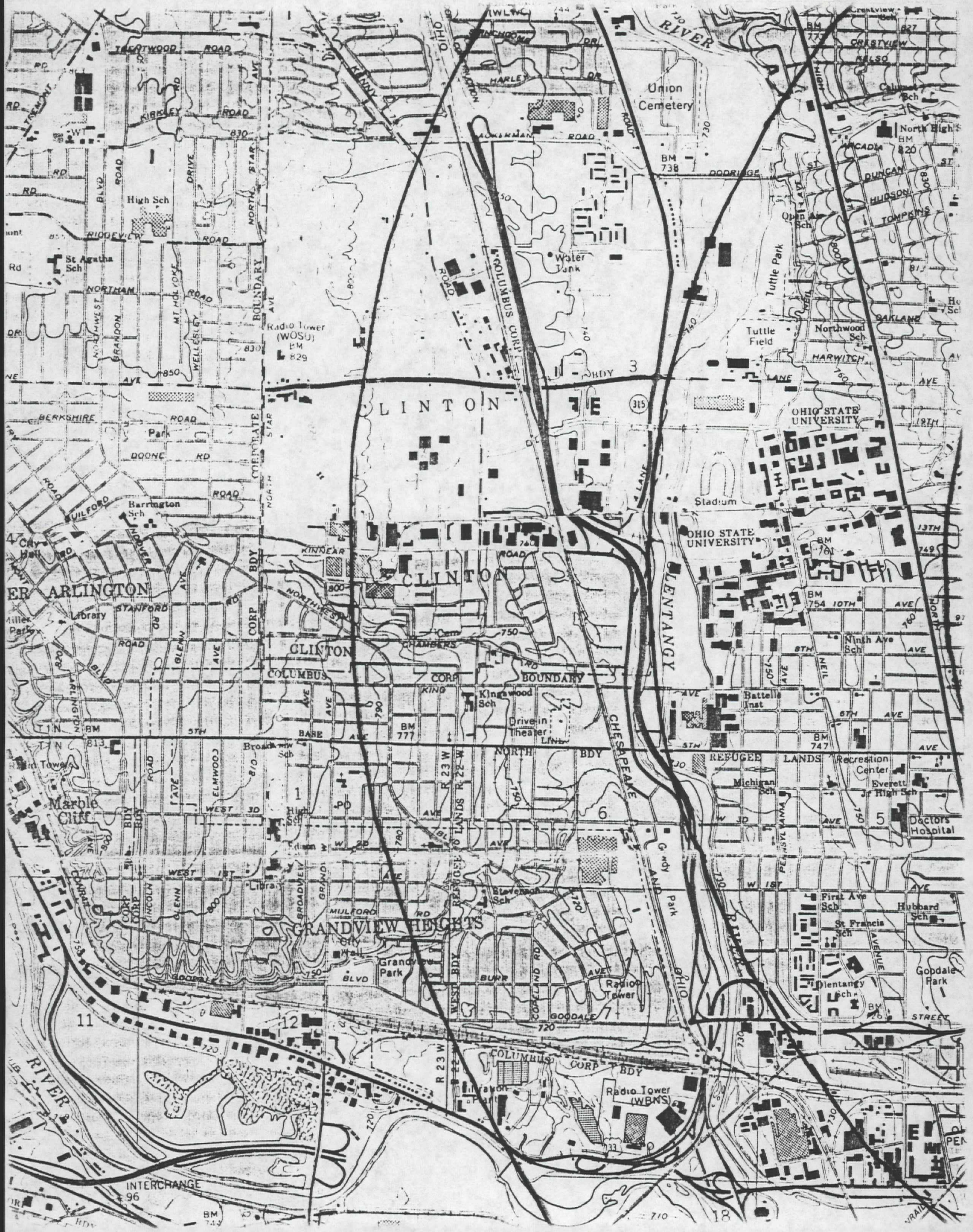
Substation
BLENDON
Water Tank
PIPELINE
MIFFLIN
BM 854
HORSE
INTERCHANGE 32
COLUMBUS CORP BDY
COLUMBUS
GAHANNA
BIG WALNUT CREEK
RIDENOUR
STYGLER
Parks Mills
MIFFLIN
Somerset Park
Royal Manor Sch
Stygler Road Sch
Ridenour Park
Stoneybrook
DAVENTRY LANE
IMPERIAL DR
Mifflin Cem
INTERCHANGE 35
Friendship Park
Goshen Lane Sch
CASSADY AVE
COLUMBUS CORP BDY
GAHANNA CORP BDY
ROAD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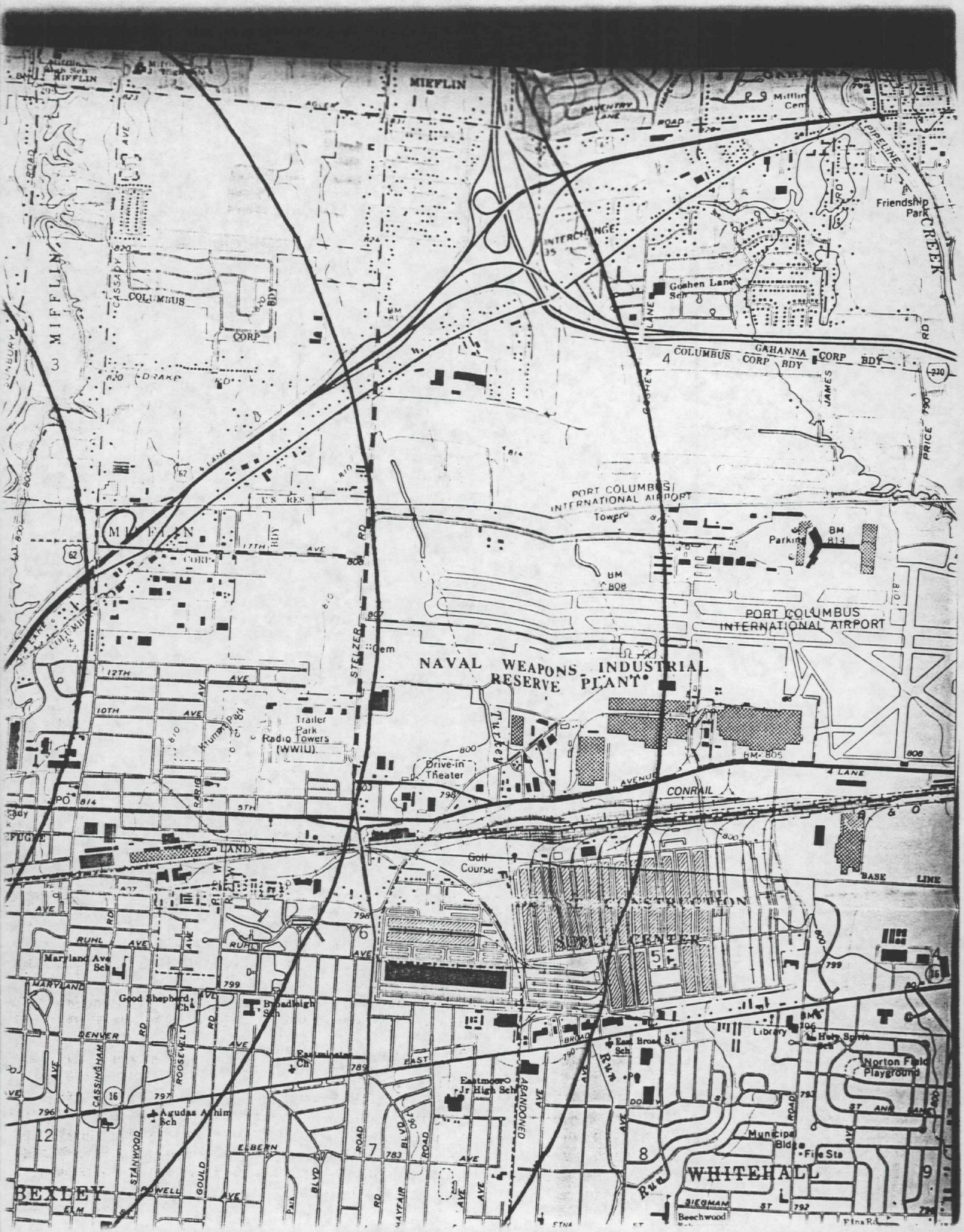
Crestview Sch
CRESTVIEW
KELSO
Calumet Sch
North High Sch
ARCADIA
DUNCAN
HUDSON
TOMPKINS
Open Air Sch
Tuttle Park
OAKLAND
Northwood Sch
Tuttle Field
HARWICH
Union Cemetery
DODRIDGE
ACKERMAN ROAD
HARLEY DR
KENNY
OHIO
FLEETWOOD ROAD
KIRKLEY ROAD
RIDGEVIEW ROAD
High Sch
St Agatha Sch
NORTHAM ROAD
NORTHWEST
BRANDON
MT HOLYOKE
WELLESLEY
BOUNDARY AVE
Radio Tower (WOSU)
BM 829
Water Tank
COLUMBUS CORP
BDY 3
315
LINTON
OHIO STATE UNIVERSITY
Stadium
BERKSHIRE ROAD
Park
DOONE RD
Barrington Sch
GUILFORD
City Hall
ARLINGTON
Library
STANFORD
Miller Park
KINNEAR ROAD
CLINTON
NORTHWEST
CHAMBERS
Cem
LANE
OLENTANGY
13TH
10TH AVE
Ninth Ave Sch
8TH AVE
COLUMBUS CORP BOUNDARY
Kingswood Sch
Drive in Theater
Battelle Inst
6TH AVE
5TH
BASE LINE
NORTH BDY
CHESAPEAKE
REFUGEE LANDS
Recreation Center
Michigan Sch
Everett Jr High Sch
Doctors Hospital
Marble Cliff
Radio Tower
Broadview Sch
WEST 3D
W 3D AVE
High Sch
PO
Edison
W 2D
R 23 W
R 22 W
REFUGEE LANDS
WEST 1ST
W 1ST AVE
First Ave Sch
Hubbard Sch
St Francis Sch
Library
Stevenson Sch
MILFORD RD
GRANDVIEW HEIGHTS
City Hall
Grandview Park
BLVD
BURR
COPELAND RD
Radio Tower
Olentangy Sch
Goodale Park
GOODALE
STREET
AND Park
OHIO
PENNSYLVANIA
AVENUE
COLUMBUS CORP BDY
Radio Tower (WBNS)
RIVER
INTERCHANGE
96
11
12
1
5
6
7
18

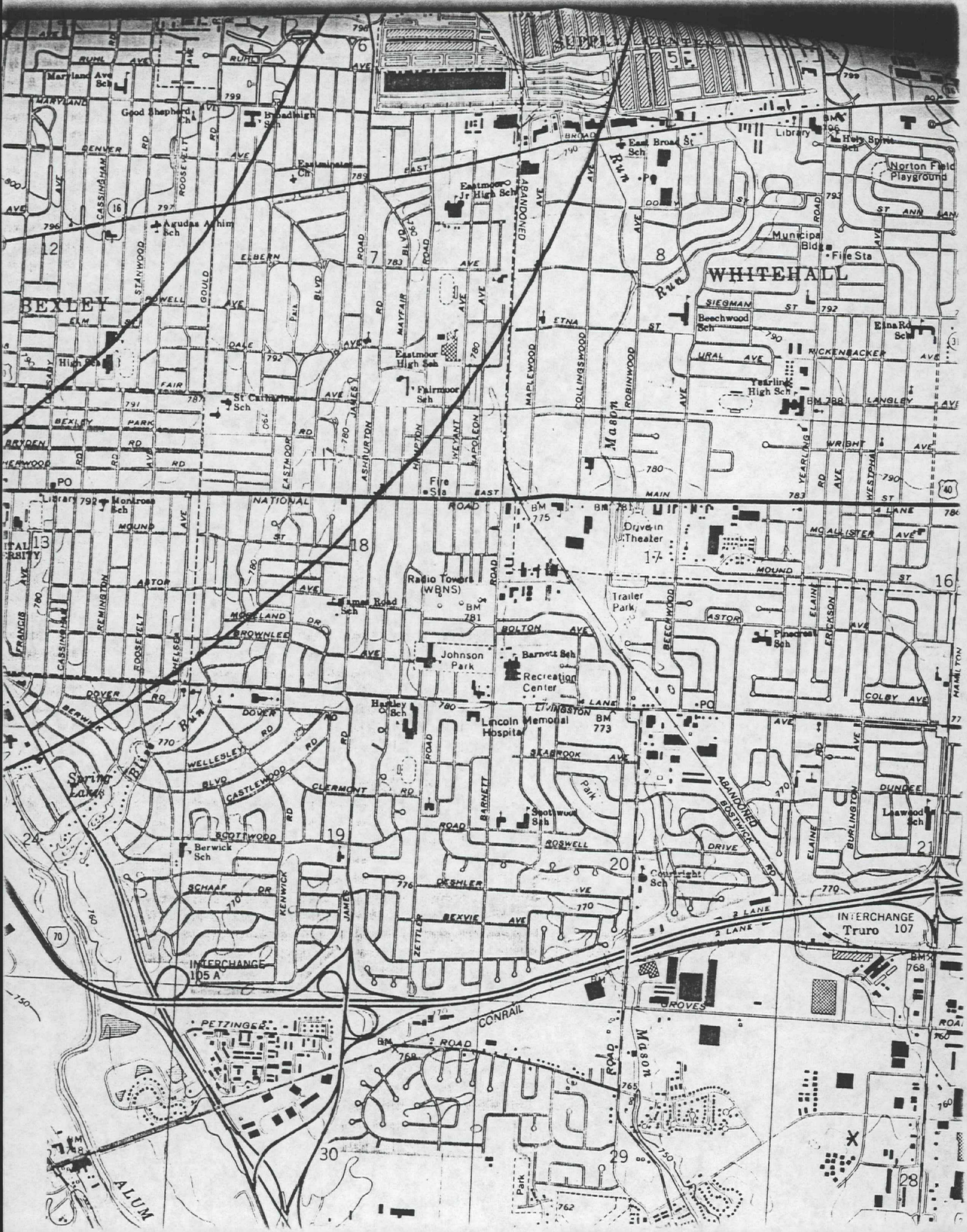

1 MILE
1/2 MILE
1/4 MILE
SITE
MIFFLIN
Audubon Park
McGuffey Sch
Linden Park
INTERCHANGE 112
McKinley High Sch
Radio Tower
Armory
Hamilton Sch
Linmoor Jr High Sch
Ohio Exposition Center
11th Ave Sch
Windsor Sch
Evergreen Burial Park
Playground
Eastlawn Burial Park
Brentnall Sch
South Mifflin Sch
St Augustine Sch
St Gabriel Sch
Joan Park
East Linden Sch
Arlington Park Sch
Moon Rock Park
Water Tank
INTERCHANGE 110 A
NORTH BOUNDARY
CONRAIL
NORFOLK AND WESTERN
CHESAPEAKE AND OHIO
COLUMBUS
FORT HAYES MIL RES
Maryland Park
Trevitt Sch
Felton Sch
Champion Sch
St Anthonys Hospital
YMCA
Library
East High
St Charles Seminary
Wolfe Park
FRANKLIN PARK
ALUM


MIFFLIN
GAHANNA
Mifflin Cem
DAVENTRY LANE
ROAD
PIPELINE
Friendship Park
CREEK
INTERCHANGE
Goshen Lane Sch
COLUMBUS
CORP
BDY
CASSADY AVE
MIFFLIN
DRAKE RD
COLUMBUS GAHANNA CORP BDY CORP BDY
GOSHEN LANE
JAMES RD
PRICE RD
270
4 LANE
62
US RES
PORT COLUMBUS INTERNATIONAL AIRPORT
Tower
Parking
BM 814
BM 808
17TH AVE
STELZER RD
Cem
PORT COLUMBUS INTERNATIONAL AIRPORT
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
12TH AVE
10TH AVE
Trailer Park
Radio Towers (WWIU)
Krumm Park
Turkey Run
Drive-in Theater
BM 805
AVENUE
CONRAIL
4 LANE
5TH
B & O
LANDS
Golf Course
BASE LINE
CONSTRUCTION SUPPLY CENTER
RUHL AVE
Maryland Ave Sch
MARYLAND
Good Shepherd Ch
Broadleigh Sch
DENVER
CASSINGHAM
ROOSEVELT
East Broad St Sch
BROAD
Library
Holy Spirit Sch
Norton Field Playground
Eastminster Ch
EAST
Eastmoor Jr High Sch
ABANDONED
Agudas Achim Sch
Municipal Bldgs
Fire Sta
ELBERN
STANWOOD
GOULD
POWELL AVE
BEXLEY
WHITEHALL
SIEGMAN ST
Beechwood
ELM
FAIRWAY BLVD
ETNA


GRANDVIEW HEIGHTS
City Hall
Grandview Park
Library
Stevenson Sch
MULFORD RD
BROADWAY
GOODALE
BLVD
BURR
COPELAND RD
Radio Tower
First Ave Sch
Hubbard Sch
St Francis Sch
Olentangy Sch
Goodale Park
STREET
AVENUE
RIVER
COLUMBUS CORP BDY
Radio Tower (WBNS)
INTERCHANGE 96
State Training Institute
Glenwood Sch
COLUMBUS STATE HOSPITAL
McKinley Ave Park
Franklinton Cem
INTERCHANGE 97
WEST
BROAD
CONRAIL
Central High Sch
Mt Carmel Hospital
Franklinton Sch
Boys Club
Avondale Sch
Community House
Starling Jr High Sch
Glenwood Park
Highland Ave Sch
St Aloysius Sch
Fire Sta
Water Tank
COLUMBUS STATE SCH
Cem
Dana Sch
Library
Sunshine Park
COLUMBUS
INTERCHANGE 98
THOMAS
Mt Calvary Cem
Baseball Park
Haunts Park
Police Sta
SULLIVANT
Central Point Shopping Center
SPRINGMONT
SAFFORD
West Mound St Sch
St Agnes Sch
Hilltonia Jr High Sch
GREENLAWN CEMETERY
Mausoleum
GREENLAWN
JACKSON
Wilson Sch
STIMMEL
Trailer Park
ROAD
INTER 105
BALTIMORE
Trailer Park
Drive-in Theater
HOPKINS
AVE
East Franklin Sch
COLUMBUS
CORP
BDY
Briggsdale
FRANKLIN

ASARCO

OUR MILE RADIUS MAP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BEXLEY
WHITEHALL
Maryland Ave Sch
Good Shepherd Ch
Broadleigh Sch
East Broad St Sch
Library
Holy Spirit Sch
Norton Field Playground
Eastminster Ch
Eastmoor Jr High Sch
Agudas Achim Sch
Municipal Bldg
Fire Sta
Beechwood Sch
Etna Rd Sch
High Sch
Eastmoor High Sch
Fairmoor Sch
St Catharine Sch
Yearling High Sch
Montrose Sch
Drive in Theater
Radio Towers (WBNS)
James Road Sch
Trailer Park
Pinecrest Sch
Johnson Park
Barnett Sch
Recreation Center
Hartley Sch
Lincoln Memorial Hospital
Spring Lakes
Scottwood Sch
Leawood Sch
Berwick Sch
Courtright Sch
INTERCHANGE Truro 107
INTERCHANGE 105 A
CONRAIL
PETZINGER
GROVES
ALUM
Mason Run
Blacklick Run
ABANDONED
RUHL AVE
MARYLAND AVE
DENVER AVE
BROAD
EAST MAIN ST
ELBERN AVE
POWELL AVE
ELM
DALE
FAIR
BEXLEY PARK RD
BRYDEN RD
SHERWOOD RD
NATIONAL ROAD
MOUND ST
ASTOR
MORELAND DR
BROWNLEE AVE
BOLTON AVE
DOVER RD
BERWICK
WELLESLEY
CASTLEWOOD BLVD
CLERMONT RD
SCOTTWOOD ROAD
ROSWELL
SCHAAF DR
DESHLER
BEXVIE AVE
SEABROOK AVE
LIVINGSTON
COLBY AVE
DUNDEE
SIEGMAN ST
ETNA ST
URAL AVE
RICKENBACKER AVE
LANGLEY AVE
WRIGHT AVE
MC ALLISTER AVE
ST ANN LANE
DORSEY ST
CASSINGHAM
STANWOOD
ROOSEVELT
GOULD RD
EASTMOOR
ASHBURTON
JAMES
HAMPTON
WEYANT
NAPOLEON
MAYFAIR
MAPLEWOOD
COLLINGSWOOD
ROBINWOOD
BEECHWOOD
YEARLING RD
WESTPHAL AVE
ELAINE RD
ERICKSON AVE
BURLINGTON AVE
HAMILTON
KENWICK
ZETTLER
BARNETT
BOSTWICK RD
FRANCIS
REMINGTON
CHELSEA
DRIVE
2 LANE
4 LANE

Appendix F

Well Logs

(14)

OHIO WATER SUPPLY BOARD

Well Record No. 133

25 Clinton

Franklin Twp. 4 Sec.

Well Location Windsor Ave., Col., O. Size 8"

Map E. Columbus

Owner Farmers Fertilizer Co. Address Columbus, Ohio

Driller G. H. Baler Date 12-23-41

Well Head Elev. or M. P.

Elev. of Ground at Well

Pumping Test: ✓

Static Level 82' Date 12-23-41

Normal Pumpage

Quality Use

Adequacy of supply

Owner's Well No. or Other Designation

Source of Data Driller

Collected by RK Date 5-5-44

STRATA	DEPTH From	DEPTH To
Yellow mud	0	42
Gray mud	42	55
Gray clay	55	77
Gray mud	77	109
gray mud and gravel	109	123
Good Gravel	123	130'8"

(3)

X = 1,867,500

Y = 727,900-S

(14) LOCATED

* Chief Aquifer

OHIO WATER SUPPLY BOARD

Well Record No. 163 JJ

25 4

Co. Franklin Twp. Sec.

Well Location 1363 Windsor Ave. Size 8"

Columbus, Ohio Map E. Columbus

1363 Windsor Ave.

Owner American Zink Oxide Address Columbus, O.

Driller G.M. Baker Date 7/8/35

Well Head Elev. or M. P.

Elev. of Ground at Well

Pumping Test: 100 GPM

Static Level 95' Date 7/8/35

Normal Pumpage

Quality Use

Adequacy of supply

Owner's Well No. or Other Designation

Source of Data Driller

Collected by R.K. Date 5/4/44

STRATA	DEPTH From	DEPTH To
Clay & boulders	0	25
Clay and large stone	25	80
Hardpan	80	95
Sand and gravel	95	120

(3)

X = 1,867,100

Y = 72,800 - S

JIS LOCATED

* Chief Aquifer

WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

No 315910

County Franklin Township Mifflin Clinton Section of Township

Owner Franklin Auto Parts Address 1000 Joyce Ave. Col's. Ohio

Location of property 1000 - Joyce, North of St. 1000 ft.

CONSTRUCTION DETAILS

Casing diameter 5 Length of casing 135 ft.

Type of screen Perf. Pipe Length of screen 2 —

Type of pump

Capacity of pump

Depth of pump setting

Date of completion Oct. 1964 —

BAILING OR PUMPING TEST

Pumping Rate G.P.M. Duration of test hrs.

Drawdown 0 ft. Date Oct 6 4

Static level-depth to water 0 ft.

Quality (clear, cloudy, taste, odor) 0

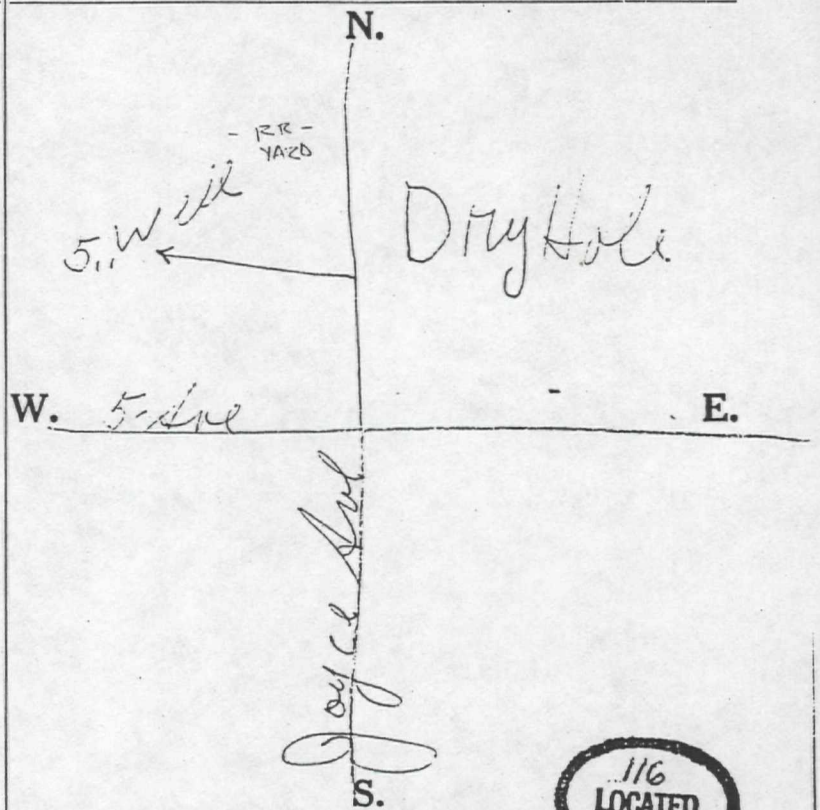
Pump installed by 0

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Yellow clay	0 Feet	15 Ft.
Gray Hard Pan	15	63
Muddy Gravel	63	67
Gray Hard Pan	67	85
Gravel Dry	85	99
Gray Shale	99	135 —

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



116 LOCATED

See reverse side for instructions

Drilling Firm R. H. Goodwin

Address 4005 East Livingston

Date Oct. 1964

Signed R. H. Goodwin

Region V RISE Information Form

(S4)

* DATE: 03/24/94

OSC/phone# Joseph Fredle, (216) 522-7260

* SAM/phone# (312) 886-3007

* State Contact/phone# LAURA FAY (614) 644-2294

* Other Contacts: DEB STRAYTON CENTRAL DISTRICT (614) 771-7505

* Who reported site: SAME

* Site Name: ASARCO

Need CERCLIS ID No.: WE NEED THIS

Need Site Specific Spill ID No.: NO

* Site Location: (address/city/county/state)
1363 WINDSOR AVE., COLUMBUS, FRANKLIN CNTY, OHIO 43211

* Site Owner Name and phone# ASARCO, 1160 STATE STREET, PERTH AMBOY, NJ 088 PHONE (908) 826-1800

* Operation Status: Active ____ Inactive X WATER TREATMENT ONL

* Site Description:
57 ACRE SITE COVERED WITH CLINKERS AND SOME REMAINING WASTE PILES. ONE BLD AREA STILL CONDUCTES SULFURIC ACID WAREHOUSE & SALES OUTLET. NO FACTORY OPERATION NOW FOR PRODUCTION OF ZINC OKIDE & SULFURIC ACID. STILL PROCESS STORM DRAIN WATER PRIOR TO DISCHARGE. THIS IS A CLOSED DOWN SMELTER WHICH PRODUCED ZNO AND H_2SO_4 FROM ZNS ORE.

* Type of Operation and Wastes: UNDER ORDERS TO APPLY FOR DES PERMI FOR STORM DRAIN WATER WHICH DISCHARGES TO AMERICAN DITCH TO ALUM CREEK. THEIR PROCESSED STORM WATER DISCARGE IS IN EXCESS OF NORMAL LIMITS FOR PH, CADMIUM CONCENTRATION & ZINC CONC.

Suspect Resource Damage: Y N (If yes, list DNR, USFW Contact) DON'T KNO

* Anticipate Site Recon/Sampling Date: ?. Priority: (High, Low) FOR PA ONLY AT THIS TIM

Site Assessment Involvement: X N Integrated Assessment: (Y) N FOR PA ONLY.

Remediation Decision (TC, NTC, NFI) Date of Decision: NO

* Prepared by: Roger C. Boyd Date: 03/24/94

(REV.1 8/93)

PLEASE NOTE LETTER DATED 03/01/94 FROM DEB STRAYTON WITH ATTACHMENTS RE THIS SMELTER OPERATION.

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 9

To JEANNE GRIFFIN	From ROGER BOYD
Co. US EPA	Co. OHIO EPA
Dept. REGION 5	Phone # (614) 644-2316
Fax # (312) 886-0753	Fax # (614) 644-3146

OhioEPA
State of Ohio Environmental Protection Agency

Central District Office

Street Address:
2300 Westbrooke Drive, Building C
Columbus, Ohio 43228
614 771 7805 FAX 614-771-7671

Mailing Address:
P.O. Box 2190
Columbus, Ohio 43266-2190

George V. Voinovich
Governor

Donald R. Schregardus
Director

MEMORANDUM

RECEIVED

TO: Laura Fay
Division of Emergency and Remedial Response
Central Office

FROM: Deborah Strayton
Division of Emergency and Remedial Response
Central District Office

SUBJECT: Preliminary Assessment Sites for our U.S. EPA FY'94 PA/SI Grant Commitment

DATE: 3/1/94

CDO will complete Preliminary Assessments as part of our FY'94 PA/SI Grant commitment to U.S. EPA for the following sites:

ASARCO, Franklin County, MSL I.D. #125-1461
D.E. Edwards Landfill, Franklin County, MSL I.D. #125-1394

There may be some concern about ASARCO's eligibility for CERCLA. ASARCO is a former zinc smelter and the material of concern mostly consists of waste and slag piles left over from the smelting process.

Under 40 CFR 261.4(b)(7)(xx), solid waste from the extraction, beneficiation, and processing of ores and minerals, such as slag from primary zinc processing, is not hazardous waste. The definition of a CERCLA hazardous substance found under 40 CFR 300.5 states that hazardous waste identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act is not a CERCLA hazardous substance if "the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress". Furthermore, 40 CFR 302.4(b) states that solid waste as defined in 40 CFR 261.2 that exhibits any of the characteristics identified in 40 CFR 261.20 through 261.24 is not a hazardous substance under Section 101 of CERCLA if it has been excluded from regulation as a hazardous waste under 40 CFR 261.4(b).

However, the material may be a hazardous substance pursuant to Section 311(b)(2)(A) or Section 307(a) of the Clean Water Act (CWA). We could not find anything specifically exempting smelting process wastes from the CWA or from CERCLA pursuant to the CWA.

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Apparently there is a "Bevill Amendment" that there is an exemption excluding certain mining wastes from the definition of hazardous substances i.e. copper slag from smelter & therefore exempt from superfund cleanup. Louisiana Pacific v ASARCO 9th Circuit

There may also be other materials at the site that are clearly hazardous substances under CERCLA.

At this time, we would like Jeanne Griffin's thoughts on ASARCO's eligibility for CERCLA. We do not want to waste time on a site if it is not eligible for CERCLA.

We also request that Roger Boyd fill our RISE Forms for these sites in order to obtain U.S. EPA I.D. numbers. I have attached copies of the MSL Referral Forms to assist Roger in this.

Attachments

cc: Roger Boyd, DERR/CO
CDO File

SITEFENCIDENT FORM 1 (SI1)
03/08/88

U.S. E.P.A. SUPERFUND PROGRAM
CERCLIS SITE INFORMATION FORM (SIF)

ENFORCEMENT SENSITIVE INFORMATION
FOR INTERNAL USE ONLY

*SITE NAME: ASARCO
*EPA ID NO: ________ FMS SITE/SPILL ID: ____

S/F RPM-OSC NAME/PHONE: ____________/(___)___-____
OTHER REG CONTACT NAME/PHONE: ____________/(___)___-____

ALIAS NAME(S): ____________, ____________
____________, ____________
____________, ____________

*LATITUDE: 39/58/45
*LONGITUDE: 82/57/05
*LL SOURCE: 7.5 QUAD MAP USGS
*LL ACCURACY: SE COLUMBUS, OHIO QUAD

STREET: 1363 WINDSOR AVE

THIS SITE NEEDS CERCLIS ID NUMBER FOR COOPERATIVE AGREEMENT PA BEING PREPARED

*CITY: COLUMBUS

*COUNTY: FRANKLIN

RCB 03/24/94

*STATE: OH

*ZIP: 43211

CONGRESSIONAL DISTRICT: __

*COUNTY CODE: 049
*SMSA: ____
USGS HYDRO UNIT: ________

*FED. FACILITY FLAG: N
*RCRA FACILITY FLAG: _
NO FURTHER ACTION FLAG: _
BIOMIN TIER: ____________
SITE NAME SOURCE: _

AGGREGATE CASE BUDGET OBLIGATIONS: ________
AGGREGATE FUND OBLIGATIONS: TBD

*SITE/INCIDENT ABSTRACT: RUN OFF FROM SITE EXCEEDS LIMITS FOR HAZ WASTE TO WATERS OF THE STATE. PH EXCEEDS 10. SOLIDS, ZNO and CD EXCEED LIMITS. SITE IS COMPLETELY LITTERED WITH PROCESS WASTE.

RCB

*SITE CLASSIFICATION: __

(NG) FUND LEAD/NEGOT
(FE) FEDERAL ENFORCEMENT
(RP) VOLUNTARY/NEGOTIATED RESP

(F) FUND LEAD/NO NEGOT
(SN) STATE NON-FUND
(LT) LIMITED TIME FOR NEGOTIATION

(SE) STATE ENFORCEMENT
(SF) STATE/FUND
(ND) NO DETERMINATION(DEFAULT)

*CORE DATA ELEMENT OF CORE

ID:

MAR 29 '94 9:43 No.001 P.05

DS=

EVENT/SUBEVENT/FINANCIAL INFORMATION (EVT/SVT/FIN) 03/08/88

U.S. E.P.A. SUPERFUND PROGRAM
CERCLIS SITE INFORMATION FORM (SIF)

ENFORCEMENT SENSITIVE INFOR. FOR INTERNAL USE ON

*SITE NAME: ASARCO
*EPA ID NO: ________ FMS SITE/SPILL ID: ____

S/I RPM-OSC NAME/PHONE: ________ /(___)
EVENT REGIONAL CONTACT NAME/PHONE: ________ /(___)
OTHER REG CONTACT NAME/PHONE: ________ /(___)

*OP UNIT / *EVENT / SUBEVENT_TYPE — *OP UNIT NAME / *EVENT NAME / *SUBEVENT_NAME — LEAD — START: PLAN (MM/DD/YY), *PLAN (FY/Q), *ACTUAL (MM/DD/YY) — COMPLETE: PLAN (MM/DD/YY), *PLAN (FY/Q), *ACTUAL (MM/DD/YY) — SPMS TARGET — ___SEAL_NO

00
DS — Site Discovery — S 03/24/94

DISCOVERY DATE 03/24/94

*TAKEOVER FLAG: ___ *FIRST START: _ *FIRST COMPLETE: _

*EVENT QUALIFIER: _ *EVENT NPL INDICATOR: _ APPROVAL AUTHORITY: __

*RCRA OFF-SITE ID: ________, ________, ________, ________, ________, ________

COOPERATIVE AGREEMENT NUMBER: ________ COOPERATIVE AGREE. AMEND NO.: __, __, __, __ STATE %: ___

V005944-01-9 OHIO EPA NEEDS CERCLIS ID FOR PA PREPARATION PER THIS COOPERATIVE AGREEMENT. RGB 03/24/94

CERCLIS FINANCIAL DATA

*FIN SEQ NO.	*FMS ELG	*FIN TYPE	BDGT SRCE	*ACCT	*DCN	*FIN AMT	*PLAN FY/Q	*FIN DATE	*FIN VEHICLE	*CONTRACTOR	*FUND PRTY STAT	*FIN NOTE

SUMMARY FMS FINANCIAL DATA

FIN SRCE	ACCT	DCN	NET COMMIT AMT	ORIG COMMIT DATE	NET OBL AMT	ORIG OBL DATE	NET OUTLAY AMT	LAST OUTLAY DATE	FIN VEHICLE	CONTRACTOR	FIN NOTE

*CORE DATA ELEMENT OR CODE

ANY QUESTIONS? CALL CSC CERCLIS STAFF

ACTION:

ID: MAR 29 '94 9:43 NO.001 P.06

DERR

Master Sites List Referral

NA - Not Applicable
UK - Unknown

Dates of Occurrence __/__/__	Discovery __/__/__	Referral 12/29/93

Site name ASARCO	Address 1363 Windsor Ave.		
City Columbus	Zip 43211	County Franklin	Dist. Central
Lat. 39° 59' 45" Long. 82° 58' 05"	Topo quad name: Southeast Columbus, Ohio		
Directions to Site: From I-71 exit to seventeenth Ave. Travel east on seventeenth Ave. approx. 1 mile. Turn south on Joyce Ave. & 1/4 mile turn West on Windsor Ave. Entrance	Site description: smelting facility with waste piles		

Referrer's name Ronald E. Nabors	Agency/Div OEPA/DERR	Ph.#(614)771-7505
Owner of released material ASARCO Incorporated Technical Services		Phone
PRP ASARCO	Address 1160 State Street	908 826-1800
City Perth Amboy	State New Jersey	Zip 08861

Release is: [√] Continuing [√] Ended [√] Intermittent [ ] Accidental [√] Not accidental

Description of Released Material (Key below)

Physical State	Quantity	Units	Material Character	Material Type	Source	Comments
s, l	uk		u, t	hm	wp	

Physical State: s = solid; l = liquid; g = gas; fp = fine powder; sl = sludge; sr = slurry
Material Character: t = toxic; c = corrosive; ra = radioactive; p = persistent; s = soluble; in = infectious; f = flammable; e = explosive; hv = highly volatile; re = reactive; u = unknown; o = other
Material Type: sl = sludge; ow = oily waste; so = solvents; pe = pesticides; ac = acids; ba = bases; oo = other organics; in = inorganics; hm = heavy metals; un = unknown
Source: d = drum; tt = truck tanker; rt = railroad tanker; l = lagoon; wp = waste pile; lf = landfill; p = pipeline; st = storage tank; of = outfall; u = unknown; o = other

Media Affected:	[√] Soil	[ ] Air	[√] Ground Water	[√] Surface Water	[√] Biota [ ] Crop
Surface water body: American Ditch/Alum Creek	Basin:				
Potential Threat To:	[√] Environment	[√] Population			Priority H - M - L

Comments: Because of run-off from the site ASARCO is being required to obtain a NPDES Permit.

DERR Use Only: Ohio ID. No. _____ Add? Y – N – ID# _____
DERR Activities Should be Coordinated With (circle appropriate):

1. DSHWM, PERMIT# _____	5. ERS, INCIDENT # _____	Contacts/Phone:
2. DWPC, PERMIT # _____	6. SIS, _____	_____
3. DGW, _____	7. SFM,	_____
4. DWQPA, _____	8. OTHER _____	_____
	9. OTHER _____	_____

INTER-OFFICE COMMUNICATION

To: Ron Nabors/Deb Strayton CDO
From: Roger Boyd RCB
Date: 03/24/94
Re: MSL Change

cc: Carole Thall CDO
Terri McCloskey
Tom Harcarik
Ramona Shaw
Mike Czelczele
Lap Van Nguyen

The following site has been submitted with a Rise Form in order to obtain a CERCLIS ID number for preparation of a Federal PA.

County	FRANKLIN
Sitename	ASARCO
Street	1363 WINDSOR AVENUE
City	COLUMBUS
Zip	43211
Epaid	NOT ASSIGNED
Oh_id	125-1451
Priority	M
Padate	02/01/54
Lat	39 59 45
Long	82 58 05
Problem	HVY METALS
Datelisted	12/30/93

Region V RISE Information Form

* DATE: 03/24/94

OSC/phone#

* SAM/phone# (312) 886-3007

* State Contact/phone# LAURA FAY (614) 644-2294

* Other Contacts: DEB STRAYTON CENTRAL DISTRICT (614) 771-7505

* Who reported site: DEB STRAYTON

* Site Name: D.E. EDWARDS LANDFILL

Need CERCLIS ID No.: WE NEED THIS

Need Site Specific Spill ID No.: NO

* Site Location: (address/city/county/state) 375 MORRISON ROAD, COLUMBUS, FRANKLIN CNTY, OHIO 43004

* Site Owner Name and phone# RAYNOND E. MASON, JR., 735 OLD OAK TRACE, COLUMBUS, OH 43235 PHONE (614) 885-7719

* Operation Status: Active_____ Inactive X

* Site Description: LANDFILL OCCUPIES APPROXIMATELY 15 ACRES OF A 44 ACRE TRACT. OTHER PARTS OF TRACT HAVE BEEN LIGHTLY AFFECTED BY CASUAL DUMPING. SITE IS ON BANK OF BIG WALNUT CREEK. NEW RESIDENTIAL CONSTRUCTION IS CURRENTLY PROCEEDING AND PORTIONS ARE PLANNED TO BE ADJACENT TO THE LANDFILL. CHILDREN COULD BE A REAL PROBLEM HERE.

* Type of Operation and Wastes: LDFL ACCEPTED ALL WASTE, WAS BEEN CLOSED SINCE THE EARLY SEVENTIES. (1972 OR SO). EARLY SAMPLING HAS REVEALED PAH's, VOC's AND CADMIUM, CHROMIUM. LEAD WAS MEASURED AT ONE SPOT AT 12,000 PARTS/MILLION.

Suspect Resource Damage: Y N (If yes, list DNR, USFW Contact), DON'T KNOW IF IT WOULD BE A NPL SITE

* Anticipate Site Recon/Sampling Date: Priority: (High, Low) FILE PA ONLY ? PROBABLY

Site Assessment Involvement: Y N Integrated Assessment: Y N

Remediation Decision (TC, NTC, NPL) Date of Decision: NO

* Prepared by: Roger Boyd Date: 03/24/94

(REV.1 8/93)

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 5
To JEANNE GRIFFIN	From ROGER BOYD
Co. US EPA	Co. OHIO EPA
Dept. REGION 5	Phone # (614) 644-2316
Fax # (312) 886-0753	Fax # (614) 644-3146

SITE/INCIDENT FORM I (SI1)
03/09/93

U.S. E.P.A. SUPERFUND PROGRAM
CERCLIS SITE INFORMATION FORM (SIF)

ENFORCEMENT SENSITIVE INFORMATION
FOR INTERNAL USE ONLY

*SITE NAME: D.E. EDWARDS LANDFILL

*EPA ID NO: ____________ PNS SITE/SPILL ID: ____

S/I RPM-OSC NAME/PHONE: ____________/(___)___-____

OTHER REG CONTACT NAME/PHONE: ____________/(___)___-____

ALIAS NAME(S): ____________

*LATITUDE: 39/59/05
*LONGITUDE: 83/51/50
*LL SOURCE: 7.5' QUAD MAP USGS
*LL ACCURACY: REYNOLDSBURG QUAD

STREET: 375 MORRISON ROAD

*CITY: COLUMBUS

THIS SITE NEEDS CERCLIS ID NUMBER FOR COOPERATIVE AGREEMENT PA BEING PREPARED.
RCB 03/24/94

*COUNTY: FRANKLIN

*STATE: OH

*ZIP: 43004

CONGRESSIONAL DISTRICT: __

*COUNTY CODE: 049
*SMSA: ____
USGS HYDRO UNIT: ______

*FED. FACILITY FLAG: N
*RCRA FACILITY FLAG: _
NO FURTHER ACTION FLAG: _
DIOXIN TIER: ____________
SITE NAME SOURCE: _

AGGREGATE CASE BUDGET OBLIGATIONS: ________
AGGREGATE FUND OBLIGATIONS: TBD

*SITE/INCIDENT ABSTRACT: THIS IS AN ABANDONED OPEN DUMP (15 ACRES) REPLETE WITH LITTER, BARRELS, REFUSE, ETC. WOODED SITE WITH UNRESTRICTED ACCESS. HAZ WASTE INCLUDES PAH'S, VOC'S, CADMIUM, CHROMIUM AND LEAD.

*SITE CLASSIFICATION: __

(NG) FUND LEAD/NEGOT
(FE) FEDERAL ENFORCEMENT
(RP) VOLUNTARY/NEGOTIATED RESP

(F) FUND LEAD/NO NEGOT
(SN) STATE NON-FUND
(LT) LIMITED TIME FOR NEGOTIATION

(SE) STATE ENFORCEMENT
(SF) STATE/FUND
(ND) NO DETERMINATION(DEFAULT)

*CORE DATA ELEMENT OR CODE

ANY QUESTIONS? CALL CSC CERCLIS STAFF

ACTION: A Cathy 6-6-214
(CSC ONLY)

DS=

EVENT/SUBEVENT/FINANCIAL INFORMATION (EVT/SVT/FIN) 03/08/88

U.S. E.P.A. SUPERFUND PROGRAM
CERCLIS SITE INFORMATION FORM (CSIF)

ENFORCEMENT SENSITIVE INFORMATION FOR INTERNAL USE ONLY

*SITE NAME: D.L. EDWARDS LANDFILL
*EPA ID NO: _____ FMS SITE/SPILL ID: ____

S/T RPM-OSC NAME/PHONE: _____/(___)___
EVENT REGIONAL CONTACT NAME/PHONE: _____/(___)___
OTHER REG CONTACT NAME/PHONE: _____/(___)___

*OP UNIT *EVENT SUBEVENT TYPE	*OP UNIT NAME *EVENT NAME *SUBEVENT NAME	LEAD	START: PLAN	START: *PLAN	START: *ACTUAL	COMPLETE: PLAN	COMPLETE: *PLAN	COMPLETE: *ACTUAL	SPMS TARGET	SPMS SCAT NOTE
			(MM/DD/YY)	(FY/Q)	(MM/DD/YY)	(MM/DD/YY)	(FY/Q)	(MM/DD/YY)		
00 DS	Site Discovery	S	__/__/__	__/__	__/__/__	__/__/__	__/__	03/24/94 DISCOVERY DATE		
__	_____	_	__/__/__	__/__	__/__/__	__/__/__	__/__	__/__/__	-	_____
__	_____	_	__/__/__	__/__	__/__/__	__/__/__	__/__	__/__/__	-	_____

*TAKEOVER FLAG: ___ *FIRST START: _ *PHASE COMPLETE: _

*EVENT QUALIFIER: _ *EVENT NPL INDICATOR: _ APPROVAL AUTHORITY: __

*RCRA OFF-SITE ID: _____ _____ _____ _____ _____ _____

COOPERATIVE AGREEMENT NUMBER: V005944-01-9 OU1 EPA NEEDS CERCLIS ID FOR PA PREPARATION PER THIS COOPERATIVE AGREEMENT. COOPERATIVE AGREE. AMEND NO.: __ __ __ __ STATE #: ___
ROB 03/24/94

CERCLIS FINANCIAL DATA

*FIN SEQ NO.	*FMS ELG	*FIN ACCT TYPE	*FIN ACCT SEQ	*OBLIGATION	*DOCUMENT	*FIN OBLIGATION	*PLANNED EVENT	*FIN OBLIGATION DATE	*FIN VEHICLE	*CONTRACTOR	*FUND PRTY SITE	*FIN NOTE
___	-	-	-	_____	_____	_____	____	_____	_____	_____	___	_____
___	-	-	-	_____	_____	_____	____	_____	_____	_____	___	_____
___	-	-	-	_____	_____	_____	____	_____	_____	_____	___	_____
___	-	-	-	_____	_____	_____	____	_____	_____	_____	___	_____

SUMMARY FMS FINANCIAL DATA

FIN SEQ	OBLIGATION	DOCUMENT	NET COMMIT AMT	ORIG COMMIT DATE	NET OBL AMT	ORIG OBL DATE	NET OUTLAY AMT	LAST OUTLAY DATE	FIN VEHICLE	CONTRACTOR	FIN NOTE
____	_____	_____	___,___,___	__/__/__	___,___,___	__/__/__	___,___,___	__/__/__	_____	_____	_____

*CODE DATA ELEMENT OR CODE

ANY QUESTIONS? CALL CSC CERCLIS STAFF

ACTION: _____ (CSC

ID:

MAR 29'94 9:46 NO.001 P.11

OHIO EPA
DERR
Master Sites List Referral

NA - Not Applicable
UK - Unknown

Dates of Occurrence ___/___/___	Discovery ___/___/___	Referral 9.14.92

Site name D.E. Edwards Landfill	Address 375 Morrison Road		
City Columbus	Zip 43204	County Franklin	Dist. CDO
Lat. 39°59'05" Long. 82°51'50"	Topo quad name: Reynoldsburg Quadrangle		
Directions to Site: Exit I-270 E at Morrison Ave. Park and walk across RR tracks west of I-270. Follow path along RR, btw between I-270 RR line & Big Walnut Creek.	Site description: Abandoned Landfill		

Referrer's name Ron Nabors	Agency/Div Ohio EPA/DERR	Ph.# (614) 771-7505

Owner of released material Daniel E. Edwards	RAYMOND & MASON, JR		
PRP Daniel E. Edwards	Address ~~375~~ 225 OLD OAK TRACE Morrison Road	(614) 835-7719	
City Columbus	State Ohio	Zip 43~~204~~ 235	
Release is: [ ] Continuing [X] Ended [ ] Intermittent	[ ] Accidental [X] Not accidental		

Description of Released Material (Key below)

Physical State	Quantity	Units	Material Character	Material Type	Source	Comments
s, sl, uk	UK		u	sl, un	d, f, u	

Physical State: s = solid; l = liquid; g = gas; fp = fine powder; sl = sludge; sr = slurry
Material Character: t = toxic; c = corrosive; ra = radioactive; p = persistent; s = soluble; in = infectious; f = flammable; e = explosive; hv = highly volatile; re = reactive; u = unknown; o = other
Material Type: sl = sludge; ow = oily waste; so = solvents; pe = pesticides; ac = acids; ba = bases; oo = other organics; in = inorganics; hm = heavy metals; un = unknown
Source: d = drum; tt = truck tankor; rt = railroad tankor; l = lagoon; wp = waste pile; lf = landfill; p = pipeline; st = storage tank; of = outfall; u = unknown; o = other

Media Affected:	[X] Soil	[X] Air	[X] Ground Water	[X] Surface Water	[X] Biota	[ ] Crop
Surface water body: Big Walnut Creek			Basin:			
Potential Threat To:	[X] Environment		[X] Population		Priority H - M - L	

Comments: This is an abandoned open dump. There are old barrels littering the site and several areas of ~~ref~~ refuse all over. Unknown what was disposed here.

DERR Use Only: Ohio ID. No. _____ Add? Y - N - ID# _____
DERR Activities Should be Coordinated With (circle appropriate):

1. OSHWM, PERMIT# _____
2. DWPC, PERMIT # _____
3. DGW, _____
4. DWDPA, _____
5. ERS, INCIDENT # _____ Contacts/Phone:
6. SIS, _____ — _____
7. SFM, _____ _____
8. OTHER _____ _____
9. OTHER _____ _____

INTER-OFFICE COMMUNICATION

To: Ron Nabors/Deb Strayton CDO
From: Roger Boyd RCB
Date: 03/24/94
Re: MSL Change

cc: Carole Thall CDO
Terri McCloskey
Tom Haroarik
Ramona Shaw
Mike Czelczele
Lap Van Nguyen

The following site has been submitted with a Rise Form in order to obtain a CERCLIS ID number for preparation of a Federal PA.

County	FRANKLIN
Sitename	D.E. EDWARDS LANDFILL
Street	375 MORRISON ROAD
City	COLUMBUS
Zip	43004
Epaid	NOT ASSIGNED
Oh_id	125-1394
Priority	M
Padate	10/21/92
Lat	39 59 05
Long	82 51 50
Problem	
Datalisted	09/15/92